Commercial Fisheries Abstracts

a monthly summary of important developments for the fishery industries

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DOUGLAS McKAY, Secretary

FISH AND WILDLIFE SERVICE

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Commercial Fisheries Abstracts

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The abstracts in this leaflet may be left in their present form; but it is suggested that to make the most efficient use of them, they be cut out on the lines designated and filed by the number in the upper left-hand corner of each. For a full description of this filing system see "Fishery Technological Abstract Card System" by Maurice E. Stansby and K. L. Osterhaug, Fishery Leaflet No. 232, obtainable free by request from Fish and Wildlife Service, Washington 25, D. C.

In addition to the regular abstracts, there is included a bibliography of references of secondary importance (without abstracts). These may be cut off on the lines designated and pasted on standard 3 x 5-inch cards for filing.

Following is a brief outline of this filing system. The numbers apply to the first digit appearing on each card. For the meaning of subsequent digits, please see the above described leaflet.

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Issued with the approval of the Bureau of the Budget, December 29, 1950

6.55 ACID PRESERVATION OF FISH AND FISH OFFAL

Peterson, H.
FAO Fisheries Bulletin (Viale delle Terme di Caracalla, Rome) 6, Nos. 1-2, 18 (January-February/March-April, 1953) (In English)

The article reviews and summarizes the various methods for the manufacture of fish silage for animal feeding. The fish used for preparing the silage should be absolutely fresh and minced thoroughly for mixing up with the preservatives. The following preservatives are discussed: (1) Sulphuric acid, which gives a semi-finished product; (2) Formic acid (finished product); (3) Sulphuric acid (finished product); (4) Sulphuric acid and molasses (finished product); and (5) Fermentation (finished product).

(1) In the manufacture of sulphuric acid silage, enough acid is added to bring the pH of the minced fish to about 2. It is estimated that for herring, sprat, and cod, about 5 to 9 liters (1.32 to 2.38 gal.) of 50% H_2SO_4 are required for 100 kg. (220.5 lb.) of fish. Concrete vats lined with bitumen are used as containers and wooden shovels are used for stirring. Before feeding, the excess acid must be neutralized. About 37 g. (1 1/3 oz.) of chalk per kg. (2.2 lb.) of silage brings the pH to about 4; the amount of chalk to be added varies from 20 to 50 g. (1/16 to 1 3/4 oz.) per kg. of silage. The partly neutralized product has a keeping quality of not more than 48 hours.

(2) Fish acidified with formic acid alone have good keeping quality even if the pH is as high as 4.5. The formic acid product is nonperishable and can be used directly without neutralization. If 90% formic acid is used, 1.0 to 1.2 liters (0.26 to 0.3 gal.) for herring and 1.8 to 2.0 liters (0.47 to 0.53 gal.) for cod are recommended. The minced fish must be thoroughly mixed with the acid.

(over)

6.3 FRACTIONATION OF CARRAGEENIN

Smith, David B. and Cook, W. H.
Archives of Biochemistry & Biophysics 45, No. 1, 232-233 (July, 1953)

Carrageenin, an extract of the red algae, Chondrus crispus and Gigartina stellata, is composed mainly of D-galactose residues linked 1, 3, the majority having an ethereal sulfate on carbon-4. L-Galactose, glucose, and other residues have also been reported. Chemical studies have usually been interpreted in terms of a single complex molecule, although the presence of different polysaccharides has not been precluded. Differences between "cold" and "hot" extracts have been ascribed to the cations present rather than to the polysaccharide anion. However, in these laboratories Chondrus carrageenin of high viscosity has been resolved into two components in the ultracentrifuge. A method has now been developed for separating these components.

Potassium salts increase the viscosity of carrageenin solutions and enhance their gelling properties. Potassium sensitivity has been found to reside in only part of the carrageenin, and this fraction is precipitated by the addition of potassium salts to carrageenin solutions too dilute to gel. This precipitate, designated κ-carrageenin, may be removed by ordinary centrifugation from the unaffected fraction, λ-carrageenin, which remains in solution. For example, about 40% of a commercial Chondrus carrageenin was precipitated by the addition to dilute aqueous solutions of potassium chloride to a concentration of 0.125 M. Increasing the potassium chloride concentration to 0.25 M precipitated little additional material (ca. 1%). About 45% was precipitated from the supernatant by the addition of ethanol. The unrecovered portion had very low viscosity. On redissolving the fractions separately after dialysis and drying, repetition of the procedure showed negligible contamination of one fraction by the other.

(over)

6.3 STUDIES ON MECHANISMS OF MANUFACTURING ALGIN. I. THEORETICAL STUDIES ON THE MANUFACTURING PROCESS OF ALGIN

Suzuki, Noboru (Faculty of Fisheries, Hokkaido University, Hakodate, Japan)
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 4, 243-249 (March, 1953) (English summary and tables)

Algin in brown algae exists in various forms, such as insoluble salts, free acid, and other complex compounds. Thus in the extraction of algin it is desirable to convert it into a definite form. This paper reports processes for manufacturing algin in which algin is converted into free acid or calcium alginate by pretreating algae with dilute hydrochloric acid or calcium salts.

Alginic acid is dissolved through neutralization by the hydroxide or carbonate of alkali metals, ammonium radical or magnesium, or through double decomposition as follows: Alg-COOH + MA = Alg-COOM + HA where Alg-COOH represents alginic acid; M, alkali metals, ammonium radical or magnesium; and A, acid radical. The mean ionization constant of alginic acid is 0.87×10^{-1}. Alginic acid is dissolved by any MA if the resulting HA has an ionization constant less than that of alginic acid.

Calcium alginate is dissolved as follows: Ca-alginate + MA = M-alginate + CaA. The solubility product of Ca-alginate is of the order of 10^{-6} (20 to 30° C.). Ca-alginate is dissolved by each MA where the corresponding solubility product of CaA is less than that of Ca-alginate. Soluble alginate is also formed because of a strongly combined complex salt between CaA and an excess of MA. Typical examples are Rochelle salt and sodium thiosulfate.

Ca-alginate is made to swell at first and then dissolved partly into soluble alginate by MA solution. CaA is then removed.

(over)

6.130 FISH BY-PRODUCTS

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1952, 36-37 (1953)

Further development of herring reduction by the alkali digestion process has been suspended since the recent decline in the market value of fish oil and the rise in the value of fish meal. Processes for the maximum recovery of high quality meal along with a satisfactory oil yield are now being emphasized. Cooking and pressing yields satisfactory products provided the raw herring have not become spoiled. This means that efficient storage procedures must be developed to handle the raw fish, or a partially processed product, in times of glut landings. Furthermore, the cook and press technique may require some changes to accommodate a preserved semi-raw material.

Macerated herring preserved with formaldehyde or other substances have been cooked and pressed in both conventional and experimental plant equipment as a part of this study. Alternatively, it is planned to study means of preserving presscake so that fresh herring may be cooked and pressed at a rate in excess of plant drying capacity.

6.3

(1) In order to convert various types of algin into free alginic acid, algae are treated with 0.1N HCl for 15-30 minutes at 50-60° C. After removal of the acid, 15% Na_2SO_3 by weight to dried algae and 30 times the quantity of water are added to the remaining algae and heated 1 hour at 60-70° C. The algae are thus completely disintegrated. Alginic acid is dissolved into sodium alginate by sodium sulfite. The solution is prevented from decomposition by microorganisms and algin is bleached by the formation of sulfur dioxide.

(2) Brown algae are treated with boiling water for 15 to 30 minutes to swell the plants. After removal from the water, the plants are treated with saturated calcium hydroxide or 0.5% calcium chloride for 15 to 30 minutes at 80-100°C. This converts the algin into Ca-alginate and makes the pigment of the cortex insoluble. Discarding the extract, the plants are treated with 0.5% sodium chloride for 30-60 minutes at 80-100°C. Ca-alginate is swelled, partly produced Na-alginate is dissolved, and the pigment is left in the plants. Without drawing off the extract, the plants are macerated with 10% sodium carbonate by weight to dried algae for 10 to 20 minutes with gentle stirring. This step proceeds rapidly and the pigment is not dissolved. Thus the algin obtained is almost white and its viscosity is high.

6.55

(3) Sulphuric acid/formic acid silage can be produced either by adding enough 85% formic acid to sulphuric acid silage neutralized to pH 4, as described in (1), to bring the pH down to 3.5 and the formic acid content to 1%, or by treating the minced fish with a mixture of 2 liters of 50% H_2SO_4 and 0.8 liter (0.21 gal.) of 85% formic acid, bringing the pH to 3.7. In the latter case, the pH rises to a maximum of 4.3 after a few days, where it will remain constant for a long time; this method has been tried on codling.

(4) Sulphuric acid/molasses silage is produced by treating 100 kg. fish with a mixture of 2 liters 50% H_2SO_4 and 20 kg. (44.1 lb.) molasses. The combination lowers the pH to 4.5 and can be used directly as a feedstuff. In hot weather, fermentation can be inhibited by adding 0.2% sodium benzoate.

(5) Fermentation silage is a product made from a mixture of 80 kg. (176.4 lb.) minced fish and 15 kg. (33.0 lb.) molasses, fermented by the lactic acid bacterium S. plantarum. The pH is lowered to about 3 to 4 in a few days and the product has good keeping quality and no unpleasant odor. Unpublished experimental results indicate that the following procedure is suitable: the mixture of fish and molasses is adjusted to a pH of about 6; the inoculated silage is incubated at 86° F. (30° C.); sufficient air supply is maintained so that a dry crust is formed on the surface of the silage.

The silage prepared by the methods described above must be packaged in water-proof containers such as metal drums, etc. The containers must be filled up and sealed against air. Directions for feeding poultry, pigs, and cattle are given. The silage must be stored below 15° C. (59° F.).

6.3

Cesium, rubidium, and ammonium salts may replace potassium, but sodium and lithium salts are without effect. A neutral electrolyte, such as sodium chloride, reduces the requirement of potassium salt for precipitation of κ-carrageenin. The carrageenin could still be fractionated with potassium chloride after treatment with sodium iodate.

Lest these fractions in commercial carrageenin were due to contamination with other species of red or brown algae, an authentic specimen of Chondrus crispus was examined. Extracts made first at 60° and then of the residue at 100° contained respectively: κ-fraction, 64 and 14%; λ-fraction, 26 and 78%; and unrecovered, 10 and 8%.

Since the fractionation is sharp, it is unlikely that the fractions are due to heterogeneity in particle size. Moreover, the sulfate contents of a carrageenin and the κ- and λ-fractions derived from it were respectively 29, 24, and 33%, and specific optical rotations were +58°, +63°, and +44°. It appears, therefore, that carrageenin contains at least two polysaccharides differing in sensitivity to potassium ion, sulfate content, and optical rotation.

The κ- and λ-fractions, which are present in all samples of carrageenin regardless of viscosity, are related to the slowly and rapidly sedimenting components observed in the ultracentrifuge only with high-viscosity samples. The explanation of the apparent discrepancy between the amount of λ-carrageenin found and the area of the minor peak lies in the limited resolving power of the ultracentrifuge. A fuller discussion will appear in a forthcoming paper, which will also give results of investigations now in progress into size, shape, and other physical properties of these fractions.

The fractionation method has been applied to extracts from some other species of red algae. Extracts of Gigartina species appear to contain less and those of Hypnea musciformis more κ-material than does Chondrus crispus. Rhodymenia palmata and Gracilaria confervoides contain no potassium-sensitive material.

2.08 USE OF CHILLED SEA WATER IN PLACE OF ICE IN TRANSPORTING FISH

Lantz, A. W. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 95, 39-44 (July, 1953)

Sea water maintained at 29° to 30° F. was compared with ice as a medium for transporting fish. Facilities for the use of the two means of refrigeration were designed by the Vancouver Station and installed aboard the commercial troller M. V. Kath-Ell.

Figure 1, omitted, shows a proposed application of the sea-water system for the hold of a trolling vessel. The designer has used eutectic plates spaced to provide adequate refrigeration in each of six compartments that replace the fish pens used in conventional fish-hold construction. Sea-water holding tanks can be installed in wooden vessels without insulating the hull. These tanks not only eliminate the handling of ice but also reduce operating and labor costs.

The captain of the M. V. Kath-Ell dresses his fish as soon as possible on catching. After rinsing them he lowers them into one of the sea-water tanks by means of a chute, and his labor problem is over until the boat reaches port. The eutectic plates aboard the Kath-Ell provide a reserve of refrigeration during periods of low demand. In this way the water temperatures remain constant when fish are placed in the tank and the demand for refrigeration exceeds the capacity of the condensing unit.

Figure 2, omitted, shows a further modification of the system. Instead of eutectic plates, the modified system uses lateral bulkheads in each of the two tanks. Chilling is provided by pumping the sea water through refrigerating coils located in the end of each tank.

 ABSTRACTER: Martin Heerdt

2.01 HYGIENE OF SEA FISH AS FOOD, THE BASIS OF QUALITY

Lehr, ----.
Fischw. - u. Feinkostind 24, 71-72 (1952)

The 2 sources of infection in sea fish are discussed briefly; the internal one is due to the passage of bacteria from the gut into the rest of the body, probably the outcome of mechanical and other stresses to which fish are exposed during fishing, and the external one, the result partly of contamination with faecal matter and partly of the cleaning and gutting procedures. The author attempted, as long ago as 1929, to incorporate antiseptics in the ice used for fish in cold storage. He also studied the bacterial content of fish boxes; rinsing with disinfectants is essential to diminish the bacterial infection.

 (The above abstract appears in Food Science Abstracts 25, No. 4, 398, July, 1953 and is reprinted here)

2.8 DEEP FAT FRYING OF BREADED FISH AND SHELLFISH

Hoyer, H. G. (Research Laboratory, Spencer Kellogg and Sons, Buffalo, N. Y.)
Fishing Gazette Annual Review Number 69, No. 13, 166, 263, 264 (1952)

The following questions and answers on deep fat frying are presented as a guide to those engaged in the cooking of breaded fishery products.

Q. What is proper handling of the frying shortening when starting up?
A. Melt slowly without overheating the fat. The temperature during melting should not exceed 300° F. If the rate of fat replacement is low, the preheated shortening should be maintained at an even lower level, say 200° F.

Q. What about the frying itself?
A. Desirable frying temperature figures have been established and should be adhered to. Too high a temperature gives a dark crust color and induces rapid breakdown of the frying fat, with increased fat absorption. Too low a temperature gives poor crust color and also higher fat absorption.

The smoke point of new shortening is around 450° F. With continued heating the smoke point becomes progressively lower. It is therefore advisable when frying is intermittent to reduce the temperature to about 200° F. and bring it back to the desired temperature immediately before frying.

The proper fat level should be maintained, as the fat in a machine with low fat level will tend to break down more rapidly.

(over)

 ABSTRACTER: Kathryn L. Osterhaug

1.95 THE PRODUCTION AND BACTERIOLOGY OF WHALEMEAT

Anonymous
Food Manufacture 28, No. 7, 278 (July 1, 1953)

Two recent reports, "Whalemeat: Production and Preservation," by J. G. Sharp and B. B. Marsh, 47 + vi pages, and "Whalemeat: Bacteriology and Hygiene," by R. H. M. Robinson, M. Ingram, R. A. M. Case, and J. G. Benstead, with appendix by H. E. Daniels, 54 + vi pages, have been reviewed and summarized. The information presented is based on findings obtained aboard factory ships operating in the Antarctic, at a whaling station in Norway, and in the F. I. O. laboratories.

According to the report, "Whalemeat: Production and Preservation," the methods used in slaughtering and handling the carcasses are almost entirely contrary to good practice, primarily because the whales are being taken for oil rather than for meat. The long interval between the death of the animal and the removal of the meat from the carcass favors bacterial decomposition and makes large quantities of the meat inedible.

If refrigeration and cold storage rooms were placed aboard the 19 existing Antarctic factory ships, each could produce between 3,000 and 4,000 tons of whalemeat a year. Two of the British factory ships are equipped for freezing whalemeat. On these vessels the flesh is cut into 5- to 15-pound pieces and pan-frozen in the form of 40- to 100-pound blocks. After freezing, each block is ice-glazed by dipping into cold water, wrapped in moisture-vapor-resistant material, and stored at -10° C. (14° F.). If the meat is protected in frozen storage as described above, it will resist dehydration and the development of rancidity in the tissue fat for as long as 10 months at -10° C. The rate of oxidation of fat in whalemeat can be further reduced by the addition of a small amount of antioxidant prior to freezing.

(over)

 ABSTRACTER: Martin Heerdt

2.8

Do not add solid fats directly to the frying kettle, but competely melt first.

Q. How about shortening replacement?
A. A continuous frying cycle should be established. The absorption cycle time should be determined by correlating the absorption ratio of product fried per hour with the total quantity of frying fat in the kettle. A complete shortening turnover should be obtained in a maximum of 20 hours.

Preheated shortening should be run into the frying kettle at a definite rate to replace shortening absorbed by the food and to maintain the correct temperature. Used fat should be discarded when the equipment is cleaned.

Q. What does clarification do?
A. Clarification by filtration or centrifuging removes insoluble materials that have collected in the fat and that, if left, will cause over-rapid breakdown of the fat. This can be either a continuous or an intermittent process.

Q. How should frying shortening be stored?
A. Shortening should generally be stored at room temperature, about 70° to 75° F., free from odors that might penetrate the fat. Containers should be kept tightly closed during storage.

Q. What makes a good frying shortening?
A. 1. A melting point near body temperature to insure the best eating quality.
2. Select hydrogenation to assure stability and long kettle life.
3. A high smoke point.

1.95 (Cross Reference: 2.00)

"Whalemeat: Bacteriology and Hygiene," classifies the bacteria associated with whalemeat into two general groups. Group 1 consists of the bacteria present throughout the carcass of the whale at the time of death, while group 2 consists of those bacteria that contaminate the meat during dressing and handling. Because of the delay in processing, the bacteria within the carcass of the whale multiply rapidly and outnumber those present in ordinary meat animals that are dressed and chilled immediately after being killed. The present method of catching and handling whales imposes a severe limitation upon attempts to reduce the initial multiplication of bacteria. The problem can be alleviated to a small degree, however, by bleeding the carcass and opening the belly wall immediately after death. These operations are standard practice in Norway. Having the abdominal cavity open while the carcass is being towed to the receiving point allows the cold sea water to enter and cool the intestines and the adjacent tissues. Reducing the time interval between the death of the whale and the freezing of the meat also helps to keep down the initial bacterial load.

Although the space on a whaling factory vessel is limited, contamination of the meat during dressing and handling for freezing can be minimized by attention to cleanliness. Experience has shown that a special deck is necessary for efficient handling. This meat deck is usually divided so that one half is used for receiving the meat in several-ton pieces with the aid of a crane while the other half is used for cutting and processing the meat.

Sterilized water is used in quantity on the meat deck for washing the surface of the meat, both while it is being handled by the crane and while it is being cut into smaller chunks for pan-freezing. Continuous sprays of chlorinated water are used throughout the cutting area to flush away blood and bits of meat. At the end of specified periods the entire meat plant and cutting deck are scrubbed with chlorinated water containing a synthetic detergent. The foregoing precautions have made it possible to produce whalemeat having a bacterial population no greater than that of ordinary meats produced in slaughterhouses on land.

2.08 (Cross Reference: 2.19)

Between February and June, 1953, the Kath-Ell made eight trips into the Port of Vancouver with spring salmon. Half of the fish from each trip were stored in ice in the refrigerated hold and half were stored in chilled sea water. On landing, the first fish taken from the sea-water tanks were difficult to distinguish from fresh-caught fish because of their appearance. Even the scales along the back were still iridescent. For the next four trips, 200 p. p. m. of $NaNO_2$ was added to the sea water with the result that leaching of blood and color on the cut surfaces was retarded. Unfortunately, however, the $NaNO_2$ also destroyed the iridescence of the scales.

Samples of fish from the chilled sea water and from the ice were taste-tested by numerous members of the Station's panel. Fish held in $NaNO_2$ sea water were preferred over iced fish. As the length of storage increased, preference for the fish from the sea-water tanks over iced fish also increased. After 19 days in ice or in sea water, 96 percent of the tasters preferred the sea-water samples.

$NaNO_2$ was omitted from the water on trips 6, 7, 8, and 9 for the purpose of obtaining the bacterial counts shown in table II, omitted. Aureomycin was added to the sea water on trip 9. The bacteria counts obtained from fish that had been stored in sea water were considerably lower than from fish stored in ice. Chilled sea water, therefore, appears to have merit as a medium for the transportation and storage of perishable fish.

8.7 HUMPBACK OIL AND THE MILK AND MILK FAT FROM THE SPERM WHALE

Pedersen, Torbjorn
Norwegian Whaling Gaz. 7, 375-8 (1952)
Chemical Abstracts 47, No. 10, 4989 (1953)

Analytical characteristics for pipeline samples drawn during the unloading at Sandar Fabrikker A/S, of humpback oil from the 1949 and 1950 production at Cap Lopez, Congo, were, respectively, as follows: free fatty acids, 1.62 and 1.30%; iodine value 134.4, 135.8; saponification equivalent 287.0, 283.0; nonsaponifiable 0.88, 0.64%; saturated acids 26.7, 27.0% (equivalent weight, 249.0, 250.9). A sample of humpback milk gave the following values (%): fat, 38.5, water 46.7, dry matter 14.8, ash 1.33. There were no reducing sugars present. Milk fat gave: iodine value 161.7, saponification equivalent 289.6, nonsaponifiable 0.40 acid value 0.37, saturated acids 32.9%, (equivalent weight 250.1).

(The above abstract appears in Journal of the American Oil Chemists' Society 30, No. 8, 342, August, 1953 and is reprinted here)

8.59 THE ISOLATION OF N-OCTANOL FROM A MARINE TUBE WORM

Idler, D. R. and Fagerlund, U. F. M. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 95, 52 (July, 1953)

As reported in Progress Report No. 92, 16-17 (1952) a crude sample of the liquid odoriferous material from the marine tube worm Eudistylia vancouveri was found to contain an alcohol uncommon to marine animals. In a continuation of this study, 26 pounds of fresh worms were ground and steam distilled. The distillate obtained was extracted with ether to isolate the desired liquid. This liquid was washed successively with dilute alkali, dilute acid, and water. A dry yield of about 0.4 ounces representing 0.09 percent of the original 26 pounds of worms was obtained.

When fractionally distilled, about two-thirds of this neutral liquid came off at 346° F. or the boiling point of normal octyl alcohol (n-octanol). This fraction exhibited an infrared spectrum identical with that of n-octanol. The melting points of three different crystalline derivatives prepared from this fraction also identified it as n-octanol, which contains 8 carbon atoms per molecule.

This is the first reported isolation of free n-octanol from an animal organism. The origin or function of n-octanol in the tube worm, however, is not known. If it has some function in the life processes, an 8-carbon-atom fatty acid may also be present in the tube worm as a product of the metabolism of octanol. An attempt will be made to isolate such a fatty acid to determine if alcohols have any significance in the formation of fatty acids in marine organisms.

 ABSTRACTER: Martin Heerdt

9.6 THE TECHNOLOGY OF HERRING UTILIZATION

Jul, Mogens and Kondrup, Mog. (Editors) (Food and Agriculture Organization of the United Nations, Rome, Italy)
Fiskeridirektoratets Skrifter, Serie Fiskeri II, No. 1, 405 pages (1953)

Report of the FAO meeting on herring technology held at Bergen, Norway, September 24-29, 1950.

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(over)

9.4 THE HISTORY OF THE FISHMONGERS' COMPANY

May, Arthur E.
Food Manufacture 28, No. 8, 322-323 (August, 1953)

The Fishmongers' Guild was organized in early Norman days. After Henry III diverted the landing of all fish to the quay at Queenhithe the fishmongers established a market in Old Fish Street. Edward I, at the beginning of his reign, removed the order that required the landing of all fish at Queenhithe for collection of a toll and gave the fishmongers their first charter. In 1272 they moved to Fish Street Hill, where they built their first hall in 1321.

Edward I liked fish, but he restricted profits on their sale by establishing maximum retail prices. The City of London did likewise by limiting profits to a penny in the shilling and forbade the keeping of fish beyond 2 days unless salted. The city also compelled all fish to be landed at the chapel on the old London Bridge for checking before delivery to the markets.

Trade mushroomed in the 14th century, many fishmongers became wealthy, and some of these exercised considerable influence in city government. The fishmongers eventually secured a complete monopoly on the sale of fish in return for providing three ships for the Royal Navy. They lost their monopoly in the 15th centruy but continued to carry out many important duties connected with the fish trade.

Originally, there were two companies, one known as the Salt Fishermongers and the other as the Stock Fishmongers. These companies used the Stocks Market and the Old Fish Street Market. Both of these markets were destroyed in the Great Fire of 1666. Eventually, the 2 companies were united by order of Henry VIII, and a second hall was built in 1671 by the architect, Edward Jarman.

(over)

 ABSTRACTER: Martin Heerdt

9.6 (Cross References: 0.6, 1.2)

Chapter 7. Eviscerating, Boning, and Filleting Machines, Anonymous.

Chapter 8. Freezing of Herring by Eirik Heen and Olaf Karlsen; Freezing and Cold Storage of Herrings by A. Banks.

Chapter 9. Salted and Spiced Herring by D. J. van Dijk; Dry Salting and Canning of Herring in British Columbia by P. A. Sunderland.

Chapter 10. Herring Delicatessen and Marinated Products by Georg Borgstrom.

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Chapter 13. The Production of Herring Oil by J. A. Lovern; New Reduction Processes by Gudmund Sand.

Chapter 14. Fish Solubles by Trygve Sparre; Note on Protein Products from Herring by J. A. Lovern.

9.4

The company's 3rd and present hall in Upper Thames Street was built in 1834.

The Fishmongers' Company duties and activities are very comprehensive. Under their charter granted by James I, they still examine all fish entering Billingsgate Market and condemn any unmarketable portion of the 500 to 1000 tons landed daily. The company also inspects salmon and other fresh-water fish, imported salmon, and shellfish, and takes action against illegal methods of fishing and marketing during closed seasons. Its central council for rivers protection sponsors laws to guard against the pollution of rivers. All oysters entering London are sampled and examined by bacteriologists of the company to prevent the spread of typhoid and related water-borne diseases common to contaminated shellfish.

Like most of the London livery companies, the Fishmongers' Company uses its net profits in supporting charities and in furthering education.

4.60 THE USE OF ANTI-OXIDANTS

Raeithel, H.
Z. Lebensmitt. -Untersuch. u. -Forsch. 95, 246-262 (1952)

A review of the properties of several commonly used anti-oxidants, with reference to tocopherol, gallic acid and gallates, vanillin, hydrocaffeic acid, dihydroquercetin, sesamol, nordihydroguaiaretic acid, butylated hydroxyanisole, and di-tert-butyl-p-cresol. Substances which enhance the action of anti-**oxidants**, the so-called synergists, are citric acid, citraconic acid, ascorbic acid, phosphates, kephalin, certain amines and amino acids, sulphydryl compounds, etc. Data are tabulated on the effect of various anti-oxidants, in combination with synergistic substances, on butter fat and lard, and on the influence of anti-**o**xidants on the flavour of milk. The quantities of various anti-oxidants which may be added to foods in the United States and in Canada are given.

(The above abstract appears in Food Science Abstracts 25, No. 4, 422, July, 1953 and is reprinted here)

4.64 ANTIOXIDANTS IN FOODS

Anonymous
Food Manufacture 28, No. 8, 305-308 (August, 1953)

Fats frequently become rancid in storage, particularly if they are exposed to air. As a result they develop an unpleasant odor and taste. Rancidity results either from the action of air (oxidative rancidity) or from the action of microorganisms (ketonic rancidity). Only oxidative rancidity, the main cause of rancidity in fats, can be controlled by antioxidants.

Oxidative rancidity is accelerated by moisture, traces of copper, nickel, iron, or manganese, storage at elevated temperatures, and exposure to light. The mechanism of chemical change is believed to consist of the absorption of oxygen by the fat with the formation of compounds that react as peroxides. The rate of oxygen absorption, however, depends upon the composition of the fat. Fats containing unsaturated fatty acid groups are more reactive than those containing saturated acids.

When the concentration of these peroxidic compounds in the fat reaches a certain level, volatile decomposition products are formed. These products are responsible for the unpleasant taste and odor associated with rancidity. Taste and smell are the best means of identifying rancidity. Progress in the decomposition of fats can be charted, however, by determining the peroxide values or by estimating the decomposition products.

Peroxide formation in fats goes through an induction period during which the reaction proceeds very slowly. Following this initial period the peroxide values increase rapidly and rancidity becomes evident to the sense of taste or smell. Variations of a few weeks to several months in the induction

(over)

 ABSTRACTER: Martin Heerdt

3.4 SMOKE CURING AND DRYING

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1952, 35-36 (1953)

An absolute method for measuring the optical density of smoke used in curing has been developed for industrial use. This method is now being used in the commercial production of a portable smoke-meter (British Patent Application No. 30987/52). The new instrument is said to be low in cost and reliable; it has been used in a few trial experiments in the Torry automatic smoking kiln.

Smoke-meter measurements in the Torry kiln have indicated that smoke density rises rapidly to a maximum once the fires have been started in the smoke-generator. Maximum smoke density is followed by a rapid decline until after 1 hour it remains at about 1/3 of the maximum density. Raking of the fires improves the density produced, but never restores the initial high density. It is believed that smoke density information will be valuable in the development of standards for smoking operations.

Controlled experiments in small-tunnel air-drying have been running almost continuously for the past nine months. The tedium of these experiments has been reduced to a minimum by automatic photographic recording of all variable factors. Thus far, the relationship between the drying time constant for cod and the shape of the fillet has been established. These findings were applied to the drying stage immediately following the short initial drying period, in which surface evaporation predominates. As a consequence, air speed was found to affect the initial shape of the drying curve relating weight to time of drying but not the subsequent and major portion of the curve.

(over)

 ABSTRACTER: Martin Heerdt

3.26 A SURVEY OF TIMES AND TEMPERATURES IN THE TRANSPORTATION, STORAGE AND DISTRIBUTION OF FROZEN FOODS

Munter, A. M.; Byrne, C. H. and Dykstra, K. G. (Birds-eye Division, General Foods Corporation, Albion, New York)
Food Technology 7, No. 9, 356-359 (September, 1953)

Frozen foods purchased at the retail level show greater quality deterioration than samples of the same product known to have been stored at 0° F. from the time of packaging. Although the industry is aware that frozen foods are not maintained at 0° F. throughout their storage life, enough information has not been available to determine where most improvement is needed.

To obtain a better view of the situation a survey was conducted in one western and two eastern distribution areas which together represent about 40% of the retail sales of a major packer. The principal objective of the survey was the accumulation of temperature and time data in existing distribution systems. Since the pattern of handling was the same in all three distribution areas, the data were combined and the results presented graphically in a series of 11 figures.

The main links in the frozen food distribution system are public refrigerated warehouses, refrigerated assembly rooms, refrigerated delivery trucks and retail food cabinets. Data were collected in all of these phases. Air and product temperatures were determined and handling practices were observed.

No really serious elevated temperatures were found in any of the public warehouses. Temperatures ranged from -18° F. to 12° F. with an average of -1.9° F. One warehouse room was found to be -18° F. while two registered 10° F. or above. Although this is a favorable picture, it must be

(over)

 ABSTRACTER: Kathryn L. Osterhaug

3.4 (Cross Reference: 3.7)

A product closely approaching "freeze dried" raw cod fillets was prepared in preliminary tests with an experimental vacuum dryer. Only 5 to 10 minutes of soaking in cold water was required for almost complete reconstitution of these fillets, which after cooking had a natural texture. It appears, therefore, that reconstitution improves and texture becomes more natural as the drying conditions approach vacuum freeze-drying. If the dried fillets were pressed to a marked degree, reconstitution required additional time and was less complete. The pressed fillets were somewhat tough after cooking.

Attempts are being made to develop a capacitance-resistance hygrometer for measuring and recording the moisture content of solids such as fish tissue during drying or rehydration. Briefly, the method is analagous with thermocouple technique. The present instrument uses an aluminum wire anodized at the tip. This anodized tip is covered with a porous conducting material so that the wire and outer layer form the plates of a condenser, the capacitance of which is sensitive to humidity. The instrument can be used as a hygrometer. Its advantages are small size, sensitivity, speedy response to small fluctuations in humidity, and low cost. The smallest element made to date is about 1/10 cu. mm. in size and is extremely sensitive at temperatures below 0° C. (32° F.). Standardization difficulties still remain to be overcome, but a new method has been devised. An additional feature of the instrument is its sensitivity to the vapors of volatile substances such as ammonia and related compounds.

Isolation and identification of the phenols in smoked fish continues to be a part of the study of the chemistry of wood smoke. The presence of 1,3-dimethyl pyrogallol has been confirmed. Catechol has not been detected in all smoked fish. Other phenolic compounds recently separated are now being investigated. The constituents of a number of commercial "smoke dips" are being separated with the hope of making it possible to distinguish between smoked and "dipped" fish. Two sample procedures have been developed for the estimation of total phenols in smoked fish as a means of measuring smoke deposition rates.

3.26

remembered that the time of exposure of frozen foods in public warehouses is long and temperatures of storage considered only slightly above normal may result in quality deterioration.

Refrigerated assembly rooms are used to prepare merchandise for distribution to retail outlets. Periods of storage in these rooms range from one day to 10 weeks or longer. However, maximum storage time usually does not exceed 2 weeks. The temperatures found in these rooms ranged from -6° F. to as high as 40° F. Fortunately, those assembly rooms handling the majority of merchandise were held at temperatures below 10° F.

Conditions in the retail delivery trucks varied greatly. The investigators accompanied 46 trucks en route on normal delivery runs. Approximately one-half of the trucks depended solely on dry ice for refrigeration. The remainder were equipped with hold-over plates. When adequate amounts of dry-ice were used, fairly good results were produced but, all too often, insufficient quantities were used. Performance of hold-over plate-type refrigerated trucks was slightly superior to that of those employing dry ice, due largely to the carry-over of lower temperature in the truck body between loading. The best over-all performance was given by those trucks that used dry ice to supplement hold-over plates.

Air temperatures at the bottom and top of 332 retail cabinets were determined. The bottom temperatures averaged 0.4° F. and the top temperatures, taken 2 inches below the indicated load line, averaged 6.9° F. The maximum temperature encountered at this point was 37° F. Conditions that allow frozen foods to be exposed to such temperatures for extended periods are considered dangerous.

4.64

period are usually attributable to the presence of minute amounts of natural antioxidants in the oil. These natural substances are usually found in crude vegetable oils and fats, unless their removal has been effected in the refining process. Only a few of the natural antioxidants, of which the tocopherols are the most common, have been isolated.

Antioxidants are substances which retard the development of rancidity. Most of these substances have an optimal level above which further additions do not give a corresponding increase in the stability of the fat. Of particular interest to the food industry is that property of antioxidants which permits them to retain their protective effect even when incorporated in fats used in baked or fried foods. This property of antioxidants is called carry through.

The action of antioxidants is frequently improved by the addition of small amounts of harmless organic acids such as citric or tartaric acid. These additives are called synergists. The ideal antioxidant for food use should be harmless and form no harmful product with the food. In addition, it should contribute stability, be readily dispersible, and not impart any foreign odor, flavor, or color even after heating or on long storage.

Antioxidants are usually most effective when mixed uniformly throughout the food product. Other methods of application include the treatment of exposed surfaces by dipping and spraying or by wrapping in antioxidant-impregnated packaging materials. The maximum amounts of propyl gallate and butylated hydroxyanisole permitted in Canada and the U. S. A. are 0.01 and 0.02 percent, respectively. Canada also permits up to 200 mg. of ascorbic acid per pound of frozen fruit. Great Britain is presently considering whether antioxidants should be permitted in some foods.

0.5 A MARINE SPECIES OF SLOW LACTOSE FERMENTING BACTERIUM

Venkataraman, R. and Sreenivasan, A. (Fisheries Tech. Station, Kozhikode)
Current Science 22, 120-121 (April, 1953)

While studying the bacterial flora of marine fish, the authors discovered a strain of slow lactose-fermenting bacteria on the gills of mackerel caught off Tellicherry. ZoBell's agar was used to make the initial isolation. This strain grew well on sea-water media but not on fresh-water media or in milk having no added salt. Even a year-old culture that had been sub-cultured 6 times failed to grow in fresh-water media. These factors indicated the presence of a typically marine species.

According to the authors, a marine bacterium capable of producing gas from lactose has not previously been described. Therefore, a full description of the strain is presented below.

Sea-water agar colonies	Bluish, gray, translucent, flat, entire
Sea-water agar slant	Translucent gray, smooth, becomes adherent and brittle later
Morphology	Rods, actively motile, small, single and pairs, 0.8 x 1.2 γ gram negative, nonspore-forming
Sea-water broth	Turbidity and thick cushion-like pellicle at top appearing like a layer of paraffin wax
Fresh-water broth	No growth
Gelatin	Not liquefied
Nitrates	Reduced to nitrites
Indole	Not produced
"Purple" milk	No change
H_2S	Not produced

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 ABSTRACTER: Martin Heerdt

0.6 FATTY ACID CONTENTS OF SELECTED FOODS BEFORE AND AFTER COOKING

Anonymous
Nutrition Reviews 11, No. 8, 255-256 (August, 1953)

It appears that only minor changes occur in the fatty acid composition of fats in the ordinary cooking procedures studied. Peroxides form somewhat in relation to the temperature and time of cooking, but may be rapidly decomposed by heat.

I. C. L. Chang and B. M. Watts have reported on the effects of cooking on the essential fatty acid content of meat and poultry. Only traces of peroxides were found in any fresh meats or cured pork. They developed during roasting of large cuts, being higher in the drippings than in the meat. Pork drippings had a rancid odor. Pork products developed considerable peroxide during frozen storage. Cooking decreased this content, especially in the drippings.

In all samples, with the exception of roast chicken, there was a loss of total unsaturated fat during cooking. This loss exceeded 2 percent only in the case of roasted pork loin and leg of lamb, which showed considerable peroxidation during cooking. These losses were apparently mostly in oleic acid.

 ABSTRACTER: Kathryn L. Osterhaug

0.5 BACTERIOLOGY

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1952, 37-38 (1953)

The study of chitinivorous bacteria on fish has been continued and is reported here. About four-fifths of the original 70 cultures of these bacteria were asporogenous gram-negative rods belonging to the Pseudomonas, Flavobacter, and Achromobacter groups. The remaining one-fifth were asporogenous gram-positive rods, mainly Coryneform in character. One of the gram-positive rods appeared to be a true Myxo-coccus, while another was related to the Pro-actinomyces and probably a species of Nocardia. A few strains were periphytic in habit, particularly the Nocardia-like species, which showed long branched filaments firmly attached to the glass slide when immersed in fluid media. One of the gram-negative species produced a beautiful violet pigment similar to that of B. violaceum.

The fish slime and gill counts obtained with aged sea water as a diluent were about 10 times greater than those obtained with Ringer's solution as a diluent. Similarly, the counts obtained with fish agar as a medium were about 10 times greater than those obtained with horse-heart agar. Combinations of aged sea water and fish agar yielded counts that were 100 times greater than combinations of Ringer's solution and horse-heart agar.

Qualitative and quantitative differences appeared to exist between the flora of a skate and a lemon sole caught in the same place and at the same time. This confirms previous data obtained from studies with herring and mackerel caught in the same place and at the same time.

 ABSTRACTER: Martin Heerdt

5.110 THE ROLE OF SOME ENZYMES FROM FISH RAW MATERIAL IN PRODUCTION OF VITAMIN A

Dmitrovskii, A. A.
Akad. Nauk S.S.S.R., Inst. Biokhim. im. A. N. Bakh, Vitaminnye Resursy i Ispol'zovanie, Sbornik 1, 266-277 (1951)
Chemical Abstracts 47, No. 11, 5630 (1953)

The internal organs mass of many of the commercial fish (pike and Lucioperca lucioperca) carry sufficient proteolytic enzyme concentrations to make them useful materials as a source of such enzymes as an aid in isolation of vitamin A. The loss of vitamin B in such treatment is very low. However, the use of such enzymes causes development of high acidity and loss of vitamin A values in the material being treated: hence, for the present the method is not recommended. The lipolytic enzymes present in fish material are undesirable since they prevent proper storage of the material. Thermal treatment up to 80° appears to be the best method of inactivation of the lipase system.

(The above abstract appears in The Journal of the American Oil Chemists' Society 30, No. 8, 346, August, 1953 and is reprinted here)

0.5 (Cross Reference: 2.01)

5.110 (Cross Reference: 0.38)

0.5

Carbohydrates, etc.	Acid and small amount of gas from dextrose, sucrose, maltose and mannitol in 24 to 48 hours. No pellicle formed. Very slight acid formation and some gas from lactose in 9 days. Pellicle formed. Glycerol was not fermented but pellicle (growth) formed
Starch	Hydrolyzed
Methyl Red	Positive; Voges Proskauer test, negative
Citrate	Not utilized. Urea; not decomposed
V. R. B. agar	No growth
Fresh-water agar	No growth
Tolerates 10% NaCl.	

Source: Gills of mackerels, off Tellicherry.

Note: All media except purple milk and fresh-water media, were made up with autoclaved sea water.

Bergey's Manual classified this microorganism as Paracolobactrum coliformae. Because of its specific marine habitat, however, it probably should be designated as P. coliformae var. marinum. Various species of Paracolobactrum have been isolated from individuals having gastroenteritis.

In their study of fresh-water fish the authors isolated and described a total of 9 different strains of Paracolobactrum, all of which differed from the marine strain described in this paper. A full account of the different types of bacteria found in marine fish will be published elsewhere.

0.6 (Cross Reference: 2.8)

1.89 FOOD VALUE OF THE EDIBLE PORTION OF THE INDIAN CHANK XANCUS PYRUM

Venkataraman, R. and Chari, S. T. (Fisheries Tech. Station, Kozhikode)
Current Science 22, 22-23 (January, 1953)

Large quantities of the Indian Chank Xancus pyrum are taken from November to April by fishermen along the East Coast of Madras in the Tanjore, Tinnevelly, and Ramnad Districts. The chank shell is used extensively for making bangles and other curios by the people of West Bengal, Assam, and East Pakistan.

The edible portion of the chank consists of a muscular foot which averages 3 percent of the total weight of the animal. A sharp knife is required as an aid in pulling the meat from the shell. Chanks are preserved and prepared as follows: The meat, salted to taste, is cooked in boiling water until almost tender. It is then cut into thin slices and dried in the sun for 2 or 3 days. The resulting chips are stored in air-tight containers. Immediately before serving, the chips are fried in deep fat. They are considered a delicacy by the fishermen who consume most of the chanks available.

The authors determined the moisture, protein, fat, and mineral content of both the raw flesh and dried chips obtained from chanks. Table I, over, shows that chank meat is especially rich in protein and minerals and comparable in composition to other lean fish.

The present production of dried chanks is not very large, and it is hoped that this delicacy will become available in larger quantities so that people other than fishermen will also be able to enjoy them.

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 ABSTRACTER: Martin Heerdt

2.0 BLACK DISCOLORATION ON NASS RIVER CRABS

Idler, D. R. and MacLeod, R. A. (Pacific Fisheries Experimental Station, Vancouver, B. C.)
Fisheries Research Board of Canada, Progress Reports of the Pacific Coast Stations, No. 95, 56-57 (July, 1953)

The under parts of Dungeness crabs caught in shallow water near the mouth of the Nass River contain a black deposit that lowers their market value. To discover the nature of the black deposit and a means of removing it, the authors made the following study.

A sample of the deposit was collected by scraping several crabs with a sharp knife. Portions of this sample were insoluble in organic solvents, and a large amount of unburned residue remained on ignition. In addition, the unidentified substance was insoluble in concentrated nitric acid and concentrated sulfuric acid but soluble in concentrated hydrochloric acid. These findings indicated the presence of certain metallic oxides.

The only metal present in sufficient quantity to permit detection by a qualitative chemical analysis of a hydrochloric acid solution of the deposit was manganese. Since the material liberated chlorine gas from a hydrochloric acid solution and oxygen from hydrogen peroxide, the presence of higher oxides of manganese was confirmed.

Quantitative analysis of the scrapings showed MnO_2 16.43, MnO 7.98, Si (as SiO_2) 30.60, bound water 19.04, and loss on ignition (organic matter) 16.11 percent. The organic matter reported consists of hair collected in the process of scraping the deposit from the crab. Substances reported as SiO_2 would actually be present partly as alkali and alkali earth silicates; therefore, the analysis totals only 90.16 percent.

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 ABSTRACTER: Martin Heerdt

2.8 ALL-PURPOSE FISH SAUCE DEBUTS

Anonymous
Quick Frozen Foods 16, No. 2, 88 (September, 1953)

An all-purpose seafood sauce with a tomato and vegetable oil base was introduced by a Long Island City, New York company. Quick frozen at the processing level, the sauce will be made available in half-pound wax buckets through retail store cabinets. It is expected to retail at approximately 29 cents per package to East Coast chain store shoppers.

Plans to add an institutional container and to pack for private label are also under consideration, company officials said.

The sauce, which will keep a week to 10 days in home refrigerators and longer at freezer temperatures, combines tomatoes, onions, green peppers, mushrooms, parsley and vegetable and olive oils with sugar and various spices and seasonings.

It is defrosted before use and may be thinned with three tablespoons of water or sauterne to taste. For baked fish dishes, it is poured over the fish prior to baking. For broiled, fried or boiled fish, it is preheated separately in a saucepan before serving.

 Reprinted in part

2.118 QUICK-FREEZE FACTORY SHIP

Anonymous
Fishing Gazette 70, No. 8, 66, 72 (August, 1953)

A new deep-freeze factory trawler has recently been launched for a Leith, England company. The Fairtry is said to combine the characteristics of an ocean-going tug, a trawler, and a Pacific Coast tuna clipper. The vessel differs from the conventional trawler in that her machinery is located amidships together with the auxiliary generating equipment. The trawl is fished over the stern and the net is hauled up through a stern chute similar to that found on whaling factory ships. The net is emptied on the deck and the fish pass through hatches in the deck to bins in between decks, where the processing begins.

The Fairtry has a navigating bridge at the after end, over the top of the stern chute, from which the speed and direction of operation of the ship can be controlled during fishing operations. The superstructure is situated slightly forward of amidships and occupies a length approximately equal to one-third the length of the ship.

Within the ship, living accommodations are provided for the crew that navigates the ship and operates her main and auxiliary machinery, and for the crew that works the fish factory. Sufficient fuel is carried in double-bottom and cross-bunker tanks to enable the vessel to remain at sea for 80 days.

When the catch has been emptied into the bins at the after end of the between decks and washed, it is gutted and headed and the livers are removed for conversion into oil. After the body of the fish leaves the automatic heading machine, it passes on a roller conveyor to an automatic filleting

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 ABSTRACTER: Roy C. Stevens

FOOD VALUE OF AN INDIAN MOLLUSC

ALL-PURPOSE FISH SAUCE

BLACK DISCOLORATION IN CRABS

QUICK-FREEZE FACTORY SHIP

2.118

machine situated fore and aft on the centerline of the ship. This machine skins, fillets and wraps, and the offal drops to a fishmeal concentrator. The wrapped fillets are then weighed and placed in quick freezers. Thorough freezing takes place in about two hours. Finally, the fillets are spray-glazed, packed in cartons and stored in the refrigerated holds of the ship.

The Fairtry has a length of 245 feet and a beam of 44 feet. The main engine is rated for 1,900 h.p. and will turn a four-bladed, right-handed propeller weighing about 3-3/4 tons. The vessel is expected to have a running speed of about 12 knots, and will trawl at about 5 knots.

The ship's refrigeration equipment is designed to quick-freeze approximately 30 tons of fish per day and to maintain a temperature of -5° F. in the storage holds. Storage capacity is said to be sufficient for 600 tons of frozen fillets, or 450 tons of frozen whole fish.

The fishmeal plant is rated to take 12 tons of offal per day, and there is a storage capacity of 100 tons of dried meal directly underneath the deck on which the filleting machine is situated. Four liver boilers have been installed and tank storage is provided for about 50 tons of liver oil.

The crew of the Fairtry is expected to total about 75 men.

1.89

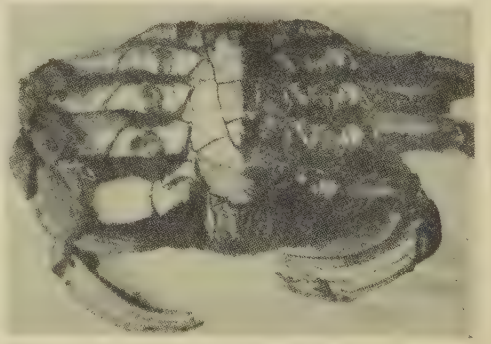
Table I
Food Values of Chank Flesh (raw) and Chank Flesh (dried chips)

Particulars	Moisture %	Protein %	Fat %	Mineral matter %	Ca %	P %	Iron mg. %	Cu mg. %	NaCl %
Chank flesh (raw)	67.50	24.84	0.82	1.84	0.13	0.094	2.71	0.43	0.35
Chank flesh (dried chips)	13.04	70.03	0.46	5.10	0.24	0.32	10.91	0.95	1.28

2.0 (Cross Reference: 1.86)

The hydrated oxides of manganese have adhesive properties that account for the binding of the deposit to the surface of the crab. The source of these oxides, however, is not obvious. Such oxides have been reported along with oxides of iron in high concentration in marine sediments, nodules, and concretions. The clays and sediments most likely to contribute the deposit, however, usually contain only 0.5 to 1.2 percent MnO_2.

MnO_2 dissolves readily in an acid solution of hydrogen peroxide. Three percent acetic acid by volume and 3 percent hydrogen peroxide was the most practical solution found for removal of the deposit. This solution was inexpensive and non-toxic to the crabs. It completely removed the black discoloration from the surface of live crabs in 3 minutes (see illustration) without contributing to the taste of the cooked meat.



Effect of an acid—peroxide solution on the black deposit on a Nass River crab.

7. 53

CONTRIBUTION TO METHODS FOR ABSOLUTE FAT DETERMINATION IN FOODS, ESPECIALLY IN HERRING

Brandes, C. H. and Dietrich, R.
Dtsch. Lebensmitt. -Rdsch. 48, 165-169 (1952)

A survey of results of analyses of fat and water in herring showed significant discrepancies in individual results, especially when comparison was made between results obtained with fish of both sexes, and of one sex only, examined separately. The fat content of herring depends greatly upon the maturity of the gonads; but even when this was taken into account, the results still showed variability. An essential prerequisite for reproducible results in the determination of fat and water in herring is a thorough comminution of the material to be examined; this is best carried out in a Multimix mincer, which reduces the fish to a uniform, paste-like mass. Data for the total fat content of herring fillets, examined under various experimental conditions, are tabulated.

(The above abstract appears in Food Science Abstracts 25, No. 4, 403, July, 1953 and is reprinted here)

7. 41

PREPARATION OF FISH TISSUES FOR GROSS BETA RADIOASSAY

Krumholz, Louis A. and Emmons, A. H. (Tennessee Valley Authority and Oak Ridge National Laboratory)
Journal of Wildlife Management 17, No. 4, 456-460 (October, 1953)

The authors used an efficient wet-digestion volumetric technique particularly suited for samples of tissue containing non-volatile, long-lived radioactive fission products. Since theirs is primarily a volumetric method, most of the weighing procedures associated with radioassay are eliminated.

When animal tissues are prepared for radioassay the sample must (1) present sufficient radioactive material for measurement, (2) be reduced to an inorganic homogeneous mass, (3) be spread evenly over the bottom of the counting dish and dried thoroughly to a thickness that will result in a minimum of self-absorption.

One- to five-gram samples of tissue were weighed into specially calibrated 25-ml. Erlenmeyer flasks, and digested overnight with 5-6 ml. of concentrated HNO_3. The resulting dissolved tissue was reduced in volume to 1-2 ml. by gentle heating at 40-60° C. and oxidized with 30% H_2O_2 to obtain a colorless solution that then was cooled, made to a volume of 5 or 10 ml., and mixed well by shaking. Duplicate 1-ml. aliquots of this solution were spread evenly over the bottom of stainless steel counting dishes 1 1/8 inches in inside diameter and dried thoroughly in air at 30° C. Measurement of radioactivity was made with an endwindow Geiger-Mueller counter.

 ABSTRACTER: Martin Heerdt

6. 130

FISH HANDLING AND PROCESSING IN EUROPE -- FISH BY-PRODUCTS

Empey, W. A. (C. S. I. R. O. Division of Food Preservation)
Fisheries Newsletter (Australia) 12, No. 6, 11 (June, 1953)

In the four European countries visited by the author, approximately 900,000 metric tons of fish and fish offal are used for conversion into fish meal and oil. About 90 percent of Norway's annual catch of 800,000 metric tons of herring is used for this purpose, while the remaining quantities of raw material are obtained from trash fish, fish processing wastes and fish rejected by the processors. Small quantities of fish flour are produced in Norway from white fish species. Norway has also developed an egg albumen substitute from white fish fillets, although similar substitutes from other materials are now tending to replace fish albumen.

Fish body oils are derived principally from herring and from the waste material from sardine and herring canning plants. Liver oils are produced mainly from the livers of cod, halibut, tuna, hake, and to a limited extent, from shark.

Most of the equipment used for fish meal and oil production is of Norwegian design and manufacture. The concentration of stickwater is a highly developed process. Many of the plants use an indirect cooking method to avoid the dilution of the stickwater that occurs when live steam is used.

White fish meal "flour" suitable for mixing with wheat flour for bakery products is produced by solvent extraction of any oil present in the fish meal and then by fine grinding. The flour is generally mixed in the proportion of seven to ten percent with wheat flour, and no change in the taste of the baked product is said to be noticeable.

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 ABSTRACTER: Roy C. Stevens

6. 3

ALGAE MIGHT FIND INDIRECT USE AS FUEL

Anonymous
Journal of Agricultural and Food Chemistry 1, No. 14, 869 (September 30, 1953)

At a recently held symposium on the utilization of solar energy, Dr. R. L. Meier of the University of Chicago suggested that algae may be grown for later fermentation to produce methane. The propagation of algae was one of the topics discussed by the 40 scientists in attendance. It was the general opinion of the group that eventually man must resort to solar radiation rather than fossil and nuclear fuels as his primary source of energy.

The advantage of converting algae into methane would be that methane is a conventional fuel that could be used with existing equipment. Dr. Meier stated that algae could be fermented by the ordinary microorganisms used in sewage disposal. Although some of the pigments found in algae, such as chlorophyll, are not fermentable, it is believed that these pigments should not cause any difficulties. While it is generally agreed that such a process is technically feasible, much investigation would be needed to make it economically practicable.

 ABSTRACTER: Roy C. Stevens

DETERMINATION OF FAT IN HERRING

FISH BYPRODUCTS IN EUROPE

TISSUE PREPARATION FOR RADIOASSAY

ALGAE AS A SOURCE OF FUEL

6.3

Acid preservation of fish and fish offal to produce a liquid ensilage for animal feeding is carried out in some areas. (See abstract 6.55 page 1)

A large proportion of the fish body oil produced in Norway and Denmark is used for the manufacture of margarine. In one large refining plant in Norway the output averages 20 tons per day throughout the year. In this factory the oil is cooled prior to removal of stearine. Cod-liver oil is cooled to about 32° F., whereas herring oil is cooled in two stages, first at 50° F., and then at 41° F. After the oils have been treated with alkali and clarified, they are subjected to high-vacuum treatment for the removal of fatty acids. Partially polymerized herring oil is now used to a large extent as a substitute for olive oil and for cottonseed oil in fish canning.

A modern Danish process for the production of fish-liver oil involves feeding the livers from a storage tank into a press that squeezes them through a perforated basket, thus converting them into a semi-liquid pulp that is then pumped through a pressure-contact emulsifier where it is heated for a few seconds to about 284° F. When the liquid has cooled it is fed to a rotojector centrifuge and the oil is then pumped to a storage tank. Because of the short heating in the absence of air, the vitamin potency of the oil is said to be about 20 percent higher than by steam extraction.

Molecular distillation is also used, particularly in Norway.

1.015 PRAWN FISHING IN MALAYA

Miller, D. D.
World Fishing 2, No. 9, 359 (September, 1953)

The Malayan prawn season is about 8 months long. During this time the fishermen go out at each change of the tide to tend their nets which are set a few miles offshore. Each boat, powered with an outboard motor, sets out with its crew of two or three just before the change of tide.

The nets are marked by poles that also act as floats for the nets. The nets are funnel-shaped, and with the motion of the sea, the prawns flow into a bag at the small end. The nets are brought to the surface by hand, the bag is untied, and the catch is emptied into a wicker basket. The catch for each net averages from 30 to 40 pounds of assorted species of fish, mainly prawns. The net is then turned to catch the opposite tide, and the boat moves on to the next set.

On return to the village, the prawns are boiled for 5 to 10 minutes and then spread out in the sun to dry. Next day, they are put into a bag and beaten to separate the skins.

A good catch of prawns may weigh 500 or 600 pounds, although the average is generally nearer 100 to 150 pounds. The fishermen receive an average of 2 s. 6 d. (U. S. $. 35) per pound for their catch of prawns, but overhead costs are high. The boats and nets come from China, and every other week the nets have to be taken up and mended and dried. The nets are preserved against rot by boiling in a solution of mangrove bark.

 ABSTRACTER: Roy C. Stevens

3.12 HYDROGEN PEROXIDE MAY BE PRACTICAL FOR COLD STERILIZING FOODS AND FERMENTATION LIQUORS

Anonymous
Food Processing 14, No. 9, 20 (September, 1953)

Interest in the use of hydrogen peroxide as a sterilizing agent or for the selective control of microorganisms is being renewed with the announcement of a catalase from liver which will effectively eliminate the peroxide at any stage of the process. The end products are water, oxygen, and a trace of a substance obtained from liver. Applications to dairy products and fermentation processes are indicated as well as operations where bleaching or oxidation are desired.

One pound of Armour Catalase 10, a tan colored powder, is capable of rapidly liberating 5000 cubic feet of oxygen from dilute solutions of hydrogen peroxide. Presently, it is produced on a small scale and is offered to research people for development work, at a price of 45 cents per gram. Production capacity is expected to keep abreast of demand as commercial uses are developed.

 Reprinted in part

2.43 THE USE OF VEGETABLE PARCHMENT IN PACKAGING FISHERY PRODUCTS

Burke, Thomas J.
Fishing Gazette 70, No. 9, 64 (September, 1953)

Vegetable parchment is said to be a perfect packaging material for wet or moist food products. It is completely and permanently insoluble in cold or boiling water and will not disintegrate or lose its wet strength in salt solutions, mild acids or alkalis. It will stretch when wet and is tougher wet than dry.

Vegetable parchment is permanently insoluble in fats or oils and certain types are specially made to resist grease penetration for long periods of time. It is basically pure cellulose, and has a very low ash content. The pH ranges from 5. 5 to 7. 0 for papers in the regular base weight range. It has a clean white color that makes it attractive for food packaging and it is also odorless and tasteless.

Vegetable parchment can be "tailor made" to fit a wide range of specifications. Water-vapor resistance and grease-resistance, for instance, can be altered where necessary. Basis weights run from 18 pounds to 110 pounds per ream (500 sheets size 24" x 36"). Most parchment is sold in the 27-pound, 35-pound, and 45-pound range, however.

The qualities of vegetable parchment make it especially suitable for use with fishery products. Waxed on one or both sides it is used for wrapping frozen fillets. The wax adds to the insulation value and assures easy stripping from the product. The oiliness of smoked fish makes vegetable parchment an excellent wrapper. Shrimp packers use the material for lining their cans, to prevent discoloration from contact with the metal, and to add attractiveness to the opened package.

 ABSTRACTER: Roy C. Stevens

2.115 SCIENTIFIC DESIGN ASSURES SANITARY FISH HOLDS

Anonymous
Fishing Gazette 70, No. 9, 58, 62 (September, 1953)

The scientifically-designed fish hold of a Gloucester trawler is described. The entire floor is of concrete in which two drain channels are cut running fore and aft. These empty into a well approximately 2 1/2 feet square by 18 inches deep, at the bottom of which is located the pump intake. This system of drainage prevents the bacteria-contaminated water from the melting ice sloshing back on the fish when the ship rolls. The drains and the well are covered with perforated hardwood covers flush with the concrete so that they may be easily removed for cleaning.

The cement base and the well are sealed for watertightness and the entire hold is insulated. Four-cornered (see diagram), galvanized steel pen-board studs make possible the division of the entire hold into pens and, at the same time, make for easier and more thorough cleaning.

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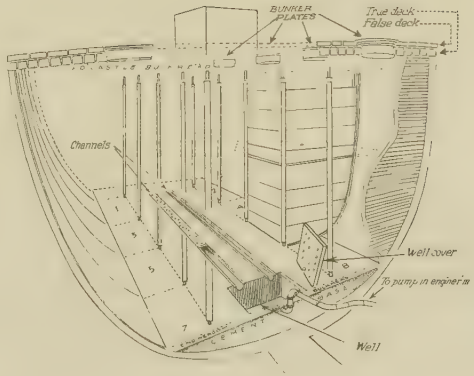
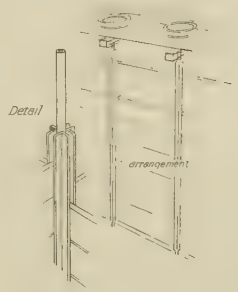
 ABSTRACTER: Roy C. Stevens

2.43 (Cross Reference: 3.238)

2.115 (Cross Reference: 2.08)





1.015 (Cross Reference: 1.85)

8.50 ALASKA POLLOCK: PROXIMATE COMPOSITION; AMINO ACID, THIAMINE, AND RIBOFLAVIN CONTENT; USE AS MINK FEED

Landgraf, R. G.
Commercial Fisheries Review 15, No. 7, 20-22 (July, 1953)

With the scarcity of flounder (Pleuronectidae) in the vicinity of Petersburg, Alaska, during the fall and spring of 1952, the commercial fur farmers of that area resorted to the use of Alaska pollock (Theragra chalcogramma) for mink feed. Since pollock had never been fed in large quantities previously in the Petersburg area, the Fishery Products Laboratory was requested to determine the composition of representative samples of this species of fish and of typical mink feeding rations prepared from this fish.

The proximate composition and "essential" amino acid, thiamine, and riboflavin content of Alaska pollock were determined. Data for flounder are given for comparison since this species of fish is considered to be suitable for mink feed by most Alaska fur farmers. The proximate composition of various pollock mink rations and a typical flounder ration is also reported. Data on the "essential" amino acid content of beef liver, an accepted animal feed, and of salmon eggs are given as a comparative index to the quality of the fish protein.

Table 3 - Amino Acid Content of Alaska Pollock, Flounder, Salmon Eggs, and Animal Liver

Material	Amino Acid Conten. of the Protein (N x 6.25)									
	Argi-nine	Histi-dine	Isoleu-cine	Leu-cine	Ly-sine	Methio-nine	Phenyl-alanine	Threo-nine	Trypto-phane	Va-line
	(Percent)									
Pollock[1] (eviscerated)	7.4	2.2	5.2	7.4	8.7	3.0	3.1	5.6	0.9	4.8
Flounder[1] (eviscerated)	7.6	2.0	4.8	7.0	8.1	2.9	3.0	5.4	0.8	4.6
Salmon eggs[2]	7.3	2.6	7.4	9.9	8.8	3.0	4.8	5.7	0.9	7.2
Animal liver[2]	6.6	2.5	4.8	8.4	7.0	3.2	6.1	5.3	1.5	6.0

(over)

 ABSTRACTER: R. G. Landgraf

8.42 TITANIUM AND ZIRCONIUM IN BLOOM OF GYMNODINIUM BREVIS DAVIS

Collier, Albert (U. S. Fish and Wildlife Service, Galveston, Texas)
Science 118, No. 3064, 329 (September, 18, 1953)

In October and November, 1952, there was an outbreak of "red tide" in the neighborhood of Sanibel Island on the west coast of Florida. The M/V Alaska, U. S. Fish and Wildlife Service, Gulf Fishery Investigations, was dispatched to the scene of the outbreak under the direction of E. L. Arnold, Jr., with instructions to collect water samples and to make detailed hydrographic and biological observations.

Numerous water samples were taken from the dense bloom of the naked dinoflagellate Gymnodinium brevis Davis. In January, 1953, a sample of this water with other samples from Lake Okeechobee, Florida, surface in central Gulf of Mexico, and a tidal lagoon, Galveston Island, were sent to the Geochemistry and Petrology Branch of the Geological Survey for spectrographic analysis.

As a result of the analysis, it was found that titanium was peculiar to the red-tide water at a concentration of 0.01-0.1% of total solids (33,700 ppm), and zirconium at 0.001-0.01% total solids (33,700 ppm). These elements did not appear in the other samples.

The largest contributer to the nonoceanic component of the neritic waters of the Sanibel Island region is Lake Okeechobee and the analysis of this water showed the presence of Ca, Na, Mg, Si, Sr, K, Al, Sn, Fe, Ba, Ni, B, Pb, Cu, Mn, Cr, and Ag, but not Ti and Zr. It is likely that Ti and Zr are normally present in the sea water in traces beyond the sensitivity of the analytical method,

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 Reprinted in whole

2.1121 DANISH SEINING

Glanville, Alan
FAO Fisheries Bulletin 6, No. 3, 63-87 (May/June, 1953)

This method of fishing was invented in 1848 by a Danish fisherman named Jans Vaever. The technique was found to be so successful that it has since spread throughout Europe and to many other parts of the world. Briefly, it involves surrounding a large area of sea bed with two very long ropes and a net in such a way that when the ropes are pulled in and the area enclosed becomes smaller, the fish on or near the bottom in the enclosed area are driven into the center and collected by the net.

Among the advantages of the method are the fact that a very large area of ground can be covered, a high percentage of the fish in the area are caught, and the quality of the fish caught is excellent, because they are in the net only a short time and are generally alive when taken aboard. Since all the work is done by the winch, the power required in relation to the quantity of fish that can be caught is quite low. For this reason, the method may be used by low-powered boats that would otherwise be able to operate only a very small trawl with a correspondingly low catching power.

The main disadvantage of the Danish seine is that the ground on which it is used must be quite smooth and free of rocks, coral, boulders, etc. Tides must not be too strong or the net will be lifted off the bottom and the fish will be lost. Gear costs are heavy, as the rope wears out and has to be replaced. In addition, this method of fishing is very tiring and requires a high degree of skill. Alternate shooting and hauling of the gear goes on continuously and fishermen have little time to rest. However, seining is generally carried on only in daylight, and the men get a chance to rest at night.

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 ABSTRACTER: Roy C. Stevens

9.7 FISHERIES RESEARCH CENTER ESTABLISHED IN SPAIN

Anonymous
FAO Fisheries Bulletin 6, No. 3, 88-89 (May/June, 1953)

The Fisheries Research Institute (Instituto de Investigaciones Pesqueras) is a new organization established under the Supreme Scientific Research Council, and forms part of the "Juan de la Cierva" Technical Research Foundation. The Institute's activities began in the middle of 1949 under the direction of a Barcelona University professor, Dr. Garcia del Cid. In July 1951 it took possession of an estate at Vigo where its Atlantic Laboratory was officially inaugurated in September 1952. Other laboratories have now been established at Blanes, Vinaroz and Castellon on the Mediterranean coast.

Vigo is considered to be an ideal location for the Center since it is one of Spain's foremost fishing ports. The laboratories are located in a stone mansion situated on a large estate close to the fishing port. The ground floor of the building is used for storage of equipment and fishing gear, the first and second floors for research laboratories, and the top floor for living quarters for the technical staff. Laboratory facilities are provided for biological, planktological, bacteriological, histological, and chemical studies besides a dissecting room, a photography room, a lounge and an extensive library. A laboratory has also been set aside for foreign research workers wishing to study marine biology or chemistry in Spanish waters.

The present work of the new Vigo Laboratory consists mainly of the study of the pilchard from a biological and technological standpoint, and of other species such as anchovy, sprat, albacore, hake, etc; specific and quantitative productivity of plankton; ecology of mollusc beds and their restoration by laying down culture beds; ecology and reproduction of littoral algae; and other problems

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 ABSTRACTER: Roy C. Stevens

2.1121 (Cross Reference: 2.14)

Two main methods of using the Danish seine are practiced: "anchor fishing" and "fly dragging." Anchor fishing is widely used in Scandinavian countries and by some English boats. The fish most usually caught by this method is plaice, although haddock, whiting and cod are also taken. The natural requirements for successful operation using this method are a smooth ground, preferably sand, mud or clay; as little tide as possible, not more than 3 knots; any depth of water up to 100 fathoms; and calm weather. The mechanical requirements are a boat of from 30 to 70 feet with an engine of from 15 to 200 horsepower.

The fly-dragging type of Danish seining is used by all the Scottish boats and, to a lesser extent, by the Irish and English. Instead of anchoring, the vessel remains under way and winches the gear in at the same time. Because the net moves over the ground more rapidly, this method is more effective for the faster-moving round fish. The conditions necessary for successful operation in fly-dragging are the same as for anchor fishing, except that an engine of at least 30 horsepower is required. A powerful, modern 60-foot vessel would need between 100 and 150 horsepower.

The author describes in detail the vessels, gear, and method of operation for both types of Danish seine fishing.

9.7

connected with the fishing industry.

A completely-equipped research vessel will soon be at the disposal of the laboratory as well as a small motor launch for work in estuarine waters.

8.50 (Cross Reference: 1.5, 6.52)

Table 1 - Proximate Composition of Alaska Pollock[1]

Sample Description	Moisture	Protein	Oil	Ash
	(Percent)			
Pollock, whole	79.1	15.3	2.9	3.3
Pollock, eviscerated	79.2	17.2	1.2	3.5
Pollock, fillets	82.5	16.8	0.7	1.1
Pollock, fillet waste	79.7	14.1	2.6	4.3
Flounder, eviscerated[2]	77.5	16.0	3.7	3.2

1/ THE PROXIMATE COMPOSITION DATA ARE TYPICAL FOR THE SIZES OF FISH CAUGHT DURING THE SPRING AND FALL OF 1952 AT PETERSBURG, ALASKA, AND MAY NOT BE APPLICABLE TO LARGER FISH OR FISH FROM OTHER AREAS.

2/ THE PROXIMATE COMPOSITION OF FLOUNDER IS GIVEN FOR COMPARISON. THE DATA ARE FROM THE ANALYSIS OF A REPRESENTATIVE SAMPLE OF FLOUNDER FED AT THE U. S. D. A. EXPERIMENTAL FUR STATION, PETERSBURG, ALASKA, DURING MAY 1951.

Table 2 - Proximate Composition of Pollock Mink Rations

Sample Description[1]	Moisture	Protein	Oil	Ash	Carbohydrate[2]
	(Percent)				
Pollock Mink Ration, A[3]	73.7	14.6	4.3	2.1	5.3
Pollock Mink Ration, B[3]	76.8	15.0	1.6	4.1	2.5
Pollock Mink Ration, C[3]	78.3	15.5	1.3	3.4	1.5
Pollock Mink Ration, D[3]	72.1	14.1	4.6	2.4	6.8
Flounder Mink Ration[4]	70.3	13.9	3.5	3.4	9.0

1/ALL FISH WERE EVISCERATED FOR PREPARATION OF POLLOCK AND FLOUNDER RATIONS. THE SAMPLES WERE TAKEN BY THE FUR FARMER. A ONE-POUND SAMPLE WAS TAKEN EACH DAY FOR ONE WEEK AS THE FEED WAS MIXED. THE SEVEN SAMPLES OF EACH RATION RECEIVED BY THE LABORATORY WERE GROUND TOGETHER, REPRESENTATIVE SAMPLES WERE THEN TAKEN, SEALED IN 1/2-POUND CANS, FROZEN, STORED AT 0° F. UNTIL NEEDED FOR ANALYSIS.

2/CARBOHYDRATE BY DIFFERENCE.

3/POLLOCK RATIONS A, B, C, AND D ARE THE WHOLE RATIONS AS FED BY DIFFERENT FUR FARMERS IN THE PETERSBURG AREA AND SHOW THE VARIATION IN RATIONS FROM FARM TO FARM. THE DATA ARE TYPICAL FOR RATIONS IN WHICH POLLOCK OF THE SIZE CAUGHT DURING THE SPRING AND FALL OF 1952 AT PETERSBURG ARE FED.

4/THE FLOUNDER RATION IS GIVEN FOR COMPARISON. IT WAS USED AT THE U. S. D. A. EXPERIMENTAL FUR STATION, PETERSBURG, ALASKA, DURING THE 1951 SPRING WHELPING EXPERIMENTS.

Table 4 - Thiamine and Riboflavin Content of Pollock, Flounder, and Gray Cod

Material	Thiamine (Micrograms Per Gram)	Riboflavin (Micrograms Per Gram)
Whole pollock	1.8	2.4
Eviscerated pollock	1.7	1.7
Flounder, edible portion[1]	0.4 to 0.7	0.4 to 0.6
Gray cod, edible portion[1]	0.9	1.6

1/SAUTIER, PHILIP M., "THIAMINE ASSAYS OF FISHERY PRODUCTS," COMMERCIAL FISHERIES REVIEW, VOL. 8, NO. 2 (FEBRUARY 1946), PP. 17-19. "RIBOFLAVIN ASSAYS OF FISHERY PRODUCTS," COMMERCIAL FISHERIES REVIEW, VOL. 8, NO. 3 (MARCH 1946), PP. 19-21.

8.42

but in this case were concentrated by the organisms of the mass bloom. The standard sensitivities given for the spectrographic method (semi-quantitative) are for zirconium 0.001%, and for titanium 0.001%.

These elements will be studied as nutritional trace elements in the cultural studies of dinoflagellates now in progress in this laboratory.

4.14 THE COMPONENT FATTY ACIDS OF ELEPHANT-SEAL OIL: VARIATIONS AND RELATIONSHIPS TO BLUBBER FATS OF OTHER SEALS

Winter, G. and Nunn, W. (Department of Supply, Melbourne, Australia)
Journal of the Science of Food and Agriculture 4, No. 9, 442-448 (September, 1953)

In recent years, several detailed analyses of seal-blubber fats have appeared in the literature. These analyses reveal certain unexpected variations for which no satisfactory explanation has yet been given. The theory has been advanced that the differences are due to species or to diet. Doubt has been cast on this explanation, however, by the discovery that the blubber fat of the elephant seal varies greatly in composition from one specimen to another. The same is true for the blubber fat from two common seals.

As the Australian National Arctic Research Expedition was studying the habits of the elephant seal and was able to supply fully identified specimens of blubber fat, the authors were prompted to study the problem further. They have now examined the blubber fats from a number of male and female animals, ranging from young pups to adults, taken at various seasons at Heard Island and Macquarie Island.

The analyses of the various samples of blubber fat of elephant seal further emphasize the fact that the composition of the fat varies greatly from one animal to another. Whereas the iodine values previously reported by the authors ranged from 115 to 153, the present study widened the range from 98 to 153.

An unexpected feature discovered in the study of the low-iodine-value fats was their relatively low content of saturated acids. They contained only about 15 percent of these acids, whereas the higher-iodine value fats contained up to 22 percent of saturated acids. This variation is contrary to previous observations that the total amount of these acids in seal blubber fat is fairly constant. The low-iodine

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 ABSTRACTER: F. Bruce Sanford

6.249 THE AUTOXIDATION OF SHARK-LIVER OIL

Nair, P. V. and Ramakrishnan, T. A.
Bull. Central Research Inst. Univ. Travancore, Trivandrum Ser. A. 1, 1-34 (1950)
Chemical Abstracts 47, No. 11, 5699-5700 (1953)

I. General considerations and procedures

Peroxide values of 0.5-g. samples of shark-liver oil were determined after storage at 29-30° in specimen tubes 4 in. long and 0.75 in. in diameter. A modified Wheeler titrimetric procedure was employed. While it could be observed that the orange-colored oils on storage would start to lose color when reaching a peroxide value of 60 and bleach out at a peroxide value of 100, coincidental with the perception of organoleptic rancidity and the approximate termination of the induction period, no such relation is found in closed storage or bulk samples.

II. Progression of peroxides in shark-liver oils with reference to their iodine values

The effect of I value on the development of peroxides was studied on shark-liver and sawfish-liver oils of I values in the range of 87-145. It is possible to diminish or enhance the period of induction without affecting the I value by refining the samples or by treating the sample with foreign antioxidants. The degree of active autoacceleration is largely governed by the degree of unsaturation. The appearance of organoleptic rancidity is also a function of the I value, the more unsaturated samples becoming organoleptically rancid only at higher peroxide values. Addition of rancid oil to fresh oil results in an abrupt enhancement of peroxides which decreases the range of the induction period. Foreign peroxides thus do not catalyze the reaction but effect a reduction in the initial induction period in proportion to the initial peroxide content of the peroxidized oil. Experimental results on an oil free of rancidity reveal that there is no relation between the age of the oil and the length of the induction period under ideal conditions of storage.

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 (The above abstract appears in The Journal of the American Oil Chemists' Society 30, No. 8, 343, August, 1953 and is reprinted here)

4.61 EFFECT OF ANTIOXIDANT ADDITION TO FISH WASTE ON FOLIC ACID AND CRUDE PROTEIN CONTENT

Hastings, W. H.
Southern Fisherman 13, No. 10, 114 (October, 1953)

A process has been developed for making a wet, fish-base trout ration into a dried pellet. The product is dried on a wide conveyor screen moving counter to a current of warm air. Pellets measuring 3/16 by 5/16 inches are dried from an initial moisture content of 40 percent to 10 percent in less than an hour with a wet bulb temperature not exceeding 89° F.

To determine what effect the processing method might have on the nutritive value of the product several factors were investigated. Microbiological assays failed to show any loss of thiamine, however folic acid seemed to be destroyed by the process.

In an effort to reduce the loss of folic acid and possibly other nutrients subject to oxidative destruction, additions of antioxidants were tried. Results of tests using a mixture of propyl gallate and butylated hydroxyanisole in propylene glycol at a level supplying the product with an active antioxidant content of 0.1 percent are presented in Table I.

The effect of added antioxidant on total crude protein was also studied. Results are given in Table II.

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 ABSTRACTER: Roy C. Stevens

4.13 BIOCHEMISTRY OF LIPIDS AND UNSATURATED FATTY ACIDS

Anonymous
Report of the Food Investigation Board (Great Britain) for the Year 1952, 38-39 (1953)

Investigation of the lipoprotein complexes of fish tissues has been initiated with an examination of the total lipid mixture present in the flesh. Haddock flesh contains only about 1 percent lipid material, most of which appears to be bound to the protein. By the application of various solvents applied consecutively, a series of tissue extracts were obtained. The first of these, an acetone extract, when studied in detail primarily by countercurrent distribution, contained phospholipins that have a fatty acid composition unlike any previously reported. This acetone extract contained, in addition, free and esterified cholesterol, waxes, triglycerides, free fatty acids, hydrocarbons, and considerable quantities of unidentified lipids. The study is presently concerned with the second, or ethanol-ether extraction.

The method being used to segregate the oxidation products of linoleic acid consists of (1) separating the total oxidized acids by distribution between low-boiling petroleum ether and 80 percent aqueous methanol, (2) decomposing the peroxide, and (3) continuously extracting an 80 percent aqueous methanol solution of the product with petroleum ether. The foregoing procedure separates the fraction that is slightly soluble in petroleum ether from the insoluble fraction which has been identified, tentatively, as a monolinoleic ester of a polyhydroxy linoleic acid. The petroleum ether-slightly soluble fraction appears to be a linoleic ester of a monohydroxy linoleic acid. Thus far, the presence of epoxy derivatives has not been established. Epoxy derivatives are believed to be formed when hydroperoxides are decomposed by carboxylic acids. The location of the "residual" OH group of the hydroperoxide remains undetermined.

 ABSTRACTER: Martin Heerdt

4.61 (Cross References: 6.51, 6.194)

Table I

Folic acid content in gamma per gram in fish meals and fish pellet, with and without antioxidant addition.

Product	Folic acid content with antioxidant	Moisture	Folic acid content without antioxidant	Moisture
Trout ration dough	1.02	40	1.00	40
Trout ration pellets	1.52	10	1.35	10
English sole dried	0.58	7	0.506	7
True cod dried	0.87	2	0.50	2
Sand sole dried	0.516	10	0.468	10

Table II

Crude protein in fish meals dried with and without antioxidant.

Product	Pounds in drier	Pounds meal	Time to dry minutes	Crude protein
English sole with	78	17	110	73.5
" " without	78	17	110	71.8
True cod with	58	14	120	71.5
" " without	56	14	120	70.5
Sand sole with				73.3
" " without	data missing but similar runs made			71.8
Fish ration dried* pellets with	200		58	35.2
without	200		58	34.2

*The air conveyor drier described in the text was used for fihe trout ration.

4.14

value fats are also distinguished by the presence of substantial amounts of long-chain acids (C_{20} to C_{24}) having a low degree of unsaturation.

Evidence has already been presented by the authors that the fat composition of the blubber from various parts of the body of one animal is substantially constant. Further evidence for this constancy is found in the present work. The composition of the fat as determined on any portion of elephant-seal blubber should therefore be reasonably representative of that of the whole blubber.

Although the total unsaturation of the blubber fat of elephant seal tends to be highest during the winter months, certain factors other than seasonal changes seem to have a major influence on the composition of these fats. There appears to be little correlation between fat composition and size, age, or sex of the animal. The authors thought that the variation in composition might be associated with the starvation periods that these animals undergo as pups during the period between leaving the mother and going to sea, and as young and adult animals twice yearly during the mating and moulting seasons. However, the authors were unable to find any such relationship.

The composition of the blubber fats from other seal species are similar to those observed for the elephant seal. Thus, there appears to be no distinct feature of blubber-fat composition that can be attributed to any one species.

The composition of seal-blubber fats may usefully be compared with that of another family of sea mammals, the Baleen whales. It appears that there is a close similarity in the distribution pattern of the unsaturated acids between the blubber fats of seals and whales. The two types of fat seem to differ mainly in the amount of saturated acids present: The whale-blubber fat contains approximately 30 percent of these acids as compared with the 15 to 22 percent contained in seal-blubber fat.

In a study of the saturation and desaturation processes during the depot-fat metabolism, the authors found that these processes are in the main confined to acids of chain length greater than C_{18}.

6.249 (Cross Reference: 4.5)

III. Viscosity of rancid and fresh oils

From the determination of kinematic viscosities of a sample each of fresh oil, rancid oil, and a 1:1 mixture of both, it was observed that the viscosity of a rancid sample is greater than that of either the fresh oil or that of the mixture. I values of both fresh and rancid oils were 90.

IV. Species specificity of induction period of shark-liver oil

A notable difference in induction periods between tiger-shark-liver oil and sawfish-liver oil indicates that different kinds of trace substances are present, and it is further evidenced by their differing responses to antioxidants. The difference in response to antioxidants can also be explained by the presence of vitamin E and tocopherols in shark-liver oils and the absence of tocopherols and presence of vitamin A in sawfish-liver oil. Because of the improvement in response to antioxidants of sawfish-liver oil to which tiger-shark oils have been added, it can be indicated that this is a better means of standardization than the addition of large bulks of vegetable oil to shark-liver oil for the same purpose.

4.60 ANTI-OXIDANTS

Reith, J. F.
Voeding 13, 497-510 (1952)
Food Science Abstracts 25, No. 4, 422 (July, 1953)

A review dealing with: the non-natural anti-oxidants; general properties required of anti-oxidants in foods; application of anti-oxidants; economic aspects; toxicity; the gallates; nordihydroguaiaretic acid; butylated hydroxyanisole; hydroquinone; dithiopropionic acid; and legal regulations.

4.61 THE EFFECT OF ANTIOXIDANTS ON THE QUALITY OF FROZEN CHICKEN AND FISH

Rice, Lyla Mae
Master's Thesis, Home Economics Department, University of Wisconsin, 1952, 52 pp.

(Abstract of this article appears under 3.249 page 5 - November, 1953 issue)

4.63 OXIDATION OF VITAMIN A IN TUNNY-LIVER OIL AND ITS STABILIZATION BY ANTIOXIDANTS

Buffa, Aldo
Conserve e deriv. agrumari (Palermo) 1 (1), 10-12 (1952)
Chemical Abstracts 47, No. 11, 5577 (1953)

The strongest protective effect was obtained with nordihydroguaiaretic acid which was still enhanced by the addition of citric acid. Et and Pr gallates were less efficacious and α-tocopherol was without influence.

6.135 NOXIOUS PLANT FUMES CONVERTED TO HARMLESS, INVISIBLE GASES

Anonymous
Food Processing 14, No. 9, 12 (September, 1953)

6.135 CAN THE SMELL FROM HERRING MEAL PLANTS BE AVOIDED?

Gloppestad, E.; Sand, G.; and Arnesen, E.
Meldinger Fra S. S. F., No. 4, 86 (June, 1953)

Pilot plant studies at Tjaereviken indicate that the 3 ways of reducing smell are less violent drying, condensation of the drier gases, and chlorination after condensation.

6.139 THE EFFECTS OF PROCESSING TEMPERATURES ON THE AMINO ACID CONTENT OF SUNFLOWER SEED OIL MEAL

Renner, Ruth; Clandinin, D. R.; Morrison, A. B.; and Robblee, A. R.
Journal of Nutrition 50, No. 4, 487 (August 10, 1953)

Less lysine, arginine and tryptophan were liberated by acid hydrolysis from a regular-temperature sunflower seed oil meal (processed at 240° F. in the cooker and 260° F. in the conditioner) than from lower medium-temperature sunflower seed oil meals (processed at 200° -220° F. and 220° - 240° F., respectively).

6.15 UTILIZATION OF STICKWATER. I. GENERAL DESCRIPTION

Anonymous
Meldinger S. S. F., No. 1, 5-14 (1950)
Food Science Abstracts 25, No. 1, 20 (January, 1953)

6.15 THE STUDY ON THE COMPLETE UTILIZATION OF WHOLE FISH. III. ABOUT THE PRODUCING OF FISH SOLUBLES FEED (1)

Kawata, Hiroshi and Takahashi, Takashi
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 10, 536 (1953) (English summary and tables)

A feed containing Animal Protein Factor and fish solubles effective for animal growth was obtained through the process of drying and absorbing in bran the N-contained liquid or fish solubles produced from autolyzed fish freed from oil, bones and indigestible protein.

6.190 CONDENSED FISH SOLUBLES AS A FEED INGREDIENT

Holder, Ralph C.
Southern Fisherman 13, No. 8, 70 (August, 1953)

6.194 EFFECT OF ANTIOXIDANT ADDITION TO FISH WASTE ON FOLIC ACID AND CRUDE PROTEIN CONTENT

Hastings, W. H.
Southern Fisherman 13, No. 10, 114 (October, 1953)

(Abstract of this article appears under 4.61 page 19)

6.195 EFFECT OF SUPPLEMENTAL DL-METHIONINE AND VARYING PROTEIN LEVELS ON GROWTH AND FEED REQUIREMENTS OF BROILER CHICKENS

Menge, H.; Denton, C. A.; and Bird, H. R.
Poultry Science 43, No. 5, 827 (September, 1953)

These data show that supplemental DL-methionine was of value in improving both rate of growth and feed efficiency of broilers to 6 weeks of age at both stations. However, methionine was of no value at Beltsville during the period from 6 to 10 weeks of age, although it did continue to improve both the rate of growth and the feed efficiency at the Maryland station.

6.195 BIOLOGICAL VALUE OF PROTEINS

Anonymous
Food Manufacture 28, No. 8, 297 (August, 1953)

(Abstract of this article appears under 0.32 page 15 - November, 1953 issue)

6.230 ANNUAL REVIEW OF LITERATURE ON FATS, OILS, AND SOAPS. I.

Piskur, M. M.
Journal of the American Oil Chemist's Society 30, No. 5, 197-212 (May, 1953)

(Abstract of this article appears under 6.131 page 9 - October, 1953 issue)

6.231 FISH-LIVER OILS

Bruzac, Jean F. A.
French Patent No. 893,231, June 2, 1944
Chemical Abstracts 47, No. 9, 4557 (1953)

An app. is described for extn. of oil from fish livers at a temp. not exceeding 50°. The oils obtained have not lost any of their medicinal qualities; in particular, vitamin A escapes destruction.

6.2333 BIOCHEMICAL STUDIES ON THE VITAMIN A IN FISH VISCERA-- II. RELATION BETWEEN THE AUTOLYSIS OF LIVER AND THE VITAMIN A POTENCY OF OIL

Ono, Toyoki; Suda, Masao; and Nagayama, Fumio
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 10, 509 (1953)
(English summary, figures and tables)

6.72 ON THE COMPLETE UTILIZATION OF MILTS II. UTILIZATION AS A SPREADER

Takaoka, Michio; Ishihara, Yoshio; and Tsujino, Isami
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 9, 389 (1953)
(English summary, tables and figures)

Dry materials of milts (herring, cod, salmon, and shark) prepared by adding compounds to them were effective as spreaders for agricultural chemicals.

6.72 THE LARGE SCALE PREPARATION OF SODIUM DESOXYRIBONUCLEATE FROM RIPE SALMON TESTES

Emanuel, C. F. and Chaikoff, I. L.
Journal of Biological Chemistry 203, No. 1, 167 (July, 1953)

A rapid method for the isolation of sodium desoxyribonucleate from ripe salmon testes gave almost quantitative yields.

6.72 STUDIES ON INSULIN OF THE MARINE-MAMMALS II.

Takaoka, Michio; Ishihara, Yoshio; Saito, Kaname; and Yokoyama, Akira
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 9, 393 (1953)
(English summary, table, and figure)

Studies on the insulin of Balaenoptera acutorostrata Lac., Orcinus rectipinna Cope, and Berardius bairdii Stejenger.

6.84 PEARLS FROM HERRING PASTE IN NORWAY

Anonymous
Western Fisheries 46, No. 5, 22 (August, 1953)

Norwegians are making a paste for artificial pearls from herring scales. A firm at Sandefjord is producing artificial pearl necklaces made from glass beads coated with a paste made from the scales of Norwegian herring. Production is in the vicinity of 12,000 necklaces a week.

6.89 NORWEGIANS PRODUCE PLASTIC FROM COD WASTE

Anonymous
U. S. Department of the Interior, Fish and Wildlife Service, Seattle, Washington, Fishery Products Report No. 138 (July 15, 1953)

A Bergen, Norway, fish firm is making a plastic from cod waste -- called "Monoplast", reports the Fishing News of June 13, a British trade magazine. The Norwegian Government is expected to give this firm financial aid to the amount of £108,300 (US $303,000) to carry on with its production of this plastic. The firm has for some time been producing "Monoplast" experimentally at its plant in the Lofoten Islands and intends to establish full commercial production at the rate of about 2,000 metric tons a year.

6.86 PHYSICO-CHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS--VII. ON THE PRESERVATION OF SHARK SKIN

Takahashi, Toyo-o and Tanaka, Takeo
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 3, 193 (1953) (English summary and figures)

The pressed, washed skin is more or less prevented from putrefaction with the decrease of water content down to about 40 or 45 percent either by pressing or dehydrating with brine.

6.86 PHYSICO-CHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS--VI. ON THE SPOILAGE OF SHARK SKIN

Takahashi, Toyo-o and Tanaka, Takeo
Bulletin of the Japanese Society of Scientific Fisheries 19, No. 3, 185 (1953)
(English summary and figures)

In the early course of the spoilage, extractive matters (mainly urea) in the green or unwashed skin are decomposed by bacteria. The hide substance (collagen) is seriously degraded by bacteria in the later course of spoilage.

6.86 PHYSICO-CHEMICAL STUDIES ON THE SKIN AND LEATHER OF MARINE ANIMALS--V. ON THE EXPRESSIBLE WATER IN SHARK SKIN

Takahashi, Toyo-o
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 3, 341 (1953)
(English summary, figures and tables)

LIST OF PUBLICATIONS REGULARLY ABSTRACTED

Analyst
Analytical Chemistry
Archives of Biochemistry and Biophysics
Atlantic Fisherman
Australian Journal of Marine and Freshwater Research
Biochemical Journal
Bulletin of the Faculty of Fisheries, Hokkaido University
Bulletin of the Japanese Society of Scientific Fisheries
California Fish and Game
Canadian Fisherman
Canadian Journal of Chemistry
Canadian Journal of Technology
Canner
Chemical Abstracts
Chemical and Engineering News
Chemical Engineering
Chemistry and Industry
Commercial Fisheries Review
Commercial Fisherman
Drug and Cosmetic Industry
FAO Fisheries Bulletin
Federation Proceedings
Feedstuffs
Fisheries Newsletter (Australia)
Fish. Res. Bd. Can., Prog. Repts. Atlantic Coast Stas.
Fish. Res. Bd. Can., Prog. Repts. Pacific Coast Stas.
Fisherman
Fishermen's News
Fishing Gazette
Flour and Feed
Food Engineering
Food Manufacture
Food Packer
Food Preservation Quarterly
Food Processing
Food Research
Food Technology
Foreign Commerce Weekly
Frosted Food Field
Industrial and Engineering Chemistry
Industrial Refrigeration
Journal of Agricultural and Food Chemistry
Journal of Applied Chemistry
Journal of Biological Chemistry
Journal of Home Economics
Journal of Nutrition
Journal of the American Chemical Society
Journal of the American Dietetic Association
Journal of the American Oil Chemists' Society
Journal of the Association of Official Agricultural Chemists
Journal of the Fisheries Research Board of Canada
Journal of the Science of Food and Agriculture
Maine Coast Fisherman
Modern Packaging
Modern Refrigeration
National Provisioner
Nature
Nutrition Reviews
Pacific Fisherman
Pan American Fisherman
Poultry Science
Practical Home Economics
Progressive Fish-Culturist
Quick Frozen Foods
Refrigerating Engineering
Report of the Food Investigation Board (Great Britain)
Science
Southern Fisherman
Trade News (Fisheries Department, Canada)
Western Canner and Packer
Western Fisheries
World Fishing

Articles chosen for abstracting or inclusion as bibliographical references are those deemed of interest to the commercial fisheries and to fishery technological laboratories. Occasionally pertinent articles from sources other than the above listed publications are included. Biological papers are generally omitted.

7.51 THE DEGRADATION OF PROTEINS

Simha, Robert
Archives of Biochemistry & Biophysics 45, No. 1, 124 (July, 1953)

Rate equations for a degrading system based on a simple step mechanism are considered.

7.52 MEROMYOSINS, THE SUBUNITS OF MYOSIN

Szent-Gyorgyi, Andrew G.
Archives of Biochemistry & Biophysics 42, No. 2, 305 (February, 1953)

7.53 CHEMICAL STUDIES ON THE WHALE BODY--I. RESEARCH OF BALEENS FROM FIN WHALE AND BLUE WHALE BY THE ELECTRON MICROSCOPE AND THE ISOLATION OF LIPIDES FROM THEM

Abe, Yoshiro and Soda, Yukio
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 7, 287 (1953)
(English summary, tables and figures)

From the ethanol extracts of blue whale, wax and sterol were obtained.

7.613 COLORIMETRIC ESTIMATION OF VITAMIN A WITH GLYCEROL DICHLOROHYDRIN

Aoyama, Masataro
Kitasato Arch. Exptl. Med. 24, 413-14 (1952) (English summary)
Chemical Abstracts 47, No. 2, 830 (1953)

7.6131 VITAMIN A DETERMINATION AND AGENTS THEREFOR

Sobel, Albert E.
U. S. Patent No. 2,594,817, April 29, 1952
Chemical Abstracts 47, No. 2, 833 (1953)

7.6139 FREE AND ESTERIFIED VITAMIN A IN FISH OILS; CHROMATOGRAPHIC SEPARATION AND COLORIMETRIC DETERMINATION

Fujita, Akiji and Aoyama, Masataro
J. Biochem. (Japan) 40, 151-6 (1953)
Chemical Abstracts 47, No. 11, 5470 (1953)

7.6139 DETERMINATION OF VITAMIN A IN THE PRESENCE OF TOCOPHEROLS

Ewing, D. T., Sharpe, L. H. and Bird, O. D.
Analytical Chemistry 25, No. 4, 599 (April, 1953)

7.64 POLAROGRAPHIC STUDIES ON "FOLIC ACID" (PRELIMINARY REPORT)

Okada, Ikunosuke; Osakabe, Isamu; Kikuchi, Takeaki; and Kuratomi, Yuji
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 10, 517 (1953)
(English summary, table and figures)

"Folic acid" was determined in aquatic products by polarographic means.

7.641 USE OF MYCOBACTERIUM CAROTINOGEN IN STUDIES ON LIVER EXTRACTS

Pradhan, V. G.
Indian J. Pharm. 14, 171-2 (1952)
Indian J. Physiol. and Allied Sci. 4, 38-41 (1950)
Chemical Abstracts 47, No. 4, 1897 (1953)

7.641 THE REDUCTION OF VITAMIN B_{12}

Boos, Richard N.; Carr, Jean E. and Conn, John B.
Science 117, No. 3048, 603 (May 29, 1953)

7.67 DETERMINATION OF VITAMIN A AND E BY PAPER CHROMATOGRAPHY

Brown, James A.
Analytical Chemistry 25, No. 5, 774-777 (May, 1953)
(Abstract of this article appears under 7.611 page 9 - August, 1953 issue)

7.80 A UNIVERSAL GUSTOMETRIC SCALE IN D-UNITS

Dove, W. Franklin (University of Illinois College of Medicine, Chicago)
Food Research 18, No. 5, 427 (September/October, 1953)

7.80 A STUDY ON THE PRESERVATION OF FISH CAKE--I. CHEMICAL DETERMINATION OF THE QUALITY OF FISH CAKE

Uchiyama, Hitoshi and Yokoyama, Wakichi
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 12, 709 (1953)
(English summary, table and figures)

Acidity, pH value and volatile basic nitrogen have been found unsuitable for judging the quality of fish cake.

7.81 FUNDAMENTAL STUDIES ON THE DETERMINATION OF VOLATILE BASIC NITROGEN BY AERATION METHOD--III. SPECIAL FACTORS AFFECTING THE VELOCITY CONSTANT IN REMOVING THE VOLATILE BASE (1)

Kawabata, Toshiharu
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 10, 525 (1953)
(English summary, tables and figures)

The volume of sample added to the aeration tube seemed to have a remarkable influence on the velocity constant.

8.51 PRELIMINARY OBSERVATIONS ON INTRASPECIFIC VARIATION OF THE LEVELS OF TOTAL PROTEIN IN THE SERA OF SOME DECAPOD CRUSTACEA

Leone, Charles A. (University of Kansas, Lawrence)
Science 118, No. 3063, 295 (September 11, 1953)

The total protein found in the sera of decapod Crustacea may vary from 0.5 g. % in one species to 8 g. % in another.

8.53 NEW ZEALAND FISH OILS. 6. SEASONAL VARIATIONS IN THE COMPOSITION OF NEW ZEALAND GROPER (POLYPRION OXYGENEIOS) LIVER OIL

Shorland, F. B.
Biochemical Journal 54, No. 4, 673-677 (July, 1953)

(Abstract of this article appears under 4.13 page 1 - October, 1953 issue)

8.53 STUDIES ON UTILIZATION OF THE LIVER OIL OF DEEP SEA SHARKS

Higashi, Hideo, Kaneko, Tokugoro; and Sugii, Kisaburo
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 9, 397-427 (1953)
(English summary, tables and figures)

II. The Determination of Hydrocarbons
III. The Determination of the Squalene Content in Hydrocarbons

8.610 CONTENT OF VITAMIN A IN BASIC COMMERCIAL FISH AND SEAL OF VOLGA-CASPIAN BASIN

Kolchev, V. V.
Akad. Nauk S. S. S. R., Inst. Biokhim. im. A. N. Bakha, Vitaminnye Resursy i Ispol'zovanie, Sbornik 1, 182-206 (1951)
Chemical Abstracts 47, No. 11, 5630 (1953)

The highest vitamin A level is found in Huso huso: 11,300 I. U./g. of intestinal fat and 7630 I. U./g. of liver fat. Silurus glanis liver contains 11,100 I. U./g. of fat, and the other fish range from 1500 to 3300 I. U./g. of fat.

8.610 CONTENT OF VITAMIN A IN FISH OF THE FAR EAST

Kizevetter, I. V. and Lagovskaya, E. A.
Akad. Nauk S. S. S. R., Inst. Biokhim. im. A. N. Bakha, Vitaminnye Resursy i Ispol'zovanie, Sbornik 1, 22-138 (1951)
Chemical Abstracts 47, No. 11, 5629 (1953)

I. Content of vitamin A in Far-Eastern cod, shark, and rays
II. Vitamin A content in Pacific Ocean salmon family fish
III. Content of vitamin A in Far-Eastern flounders
IV. Content of vitamin A in the liver of goby fish and other species of marine fish

8.612 UTILIZATION OF VITAMIN A IN FISH ORGANS. IX. DISTRIBUTION (3)

Katsui, Goichiro
J. Fermentation Technol. (Japan) 26, 88-97 (1948)
Chemical Abstracts 47, No. 2, 829 (1953)

8.6170 VITAMIN A CONTENT OF FISH OF SIBERIA

Kizevetter, I. V. and Lagovskaya, E. A.
Akad. Nauk S. S. S. R., Inst. Biokhim. im. A. N. Bakha, Vitaminnye Resursy i Ispol'zovanie, Sbornik 1, 216-221 (1951)
Chemical Abstracts 47, No. 11, 5630 (1953)

Examn. of various sturgeon, salmon, carp, pike, and cod groups of fish showed that only the salmon family carried high levels of vitamin A (in the liver fat), and to 28,000 I. U./g. of liver fat is found during the late summer months. Lota lota species are a promising source despite low concn. of the vitamin in the liver fat, the wt. per kg. is appreciable (up to 19,560 I. U.). Stenodus leucichthys has the highest concen. (up to 28,000 I. U.) in the liver fat.

8.6177 STUDIES ON FLUCTUATION OF THE VITAMIN A CONTENT IN FISHES-- II. STUDY ON VITAMIN A IN SHARKS

Higashi, Hideo; Hirao, Shuichi; Shimizu, Kazuko; Yamade, Juami; and Kikuchi, Ryo
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 8, 349 (1953) (English summary)

The results are very similar to those obtained from the vitamin analysis of the dogfish reported in the previous paper (Bull. Jap. Soc. Sci. Fish. 18, No. 7, 310 (1953)).

8.64 STUDIES ON THE VITAMIN B_{12} OF AQUATIC ANIMALS -- III. THE VITAMIN B_{12} CONTENT OF SHELL FISH

Yanse, Masaaki
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 11, 636-638 (March 25, 1953)

8.64 CONTENT OF VITAMINS IN CANNED FISH

Val'ter, L. Ya.; Nemets, S. M.; and Sinyakova, Z. M.
Rybnoe Khoz., No. 5, 56-9 (1952)
Chemical Abstracts 47, No. 11, 5574 (1953)

Analyses for thiamine, riboflavin, and nicotinic acid are given for production-type fish products (canned) made in U. S. S. R. Thiamine declines after prolonged sterilization; nicotinic acid behaves similarly, but riboflavin usually shows a rise after heat sterilization.

8.65 ASCORBIC ACID OF INTERRENAL TISSUE OF TELEOSTEAN FISHES

Hatey, J.
Compt. rend. soc. biol. 146, 566-8 (1952)
Chemical Abstracts 47, No. 3, 1299 (1953)

The anterior interrenal tissue corresponds to the adrenal cortex of mammals. In the several species of fishes examd. this tissue proved rich in ascorbic acid.

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9.11 ON A NEW BOTTOM SNAPPER

Tamura, Tadashi
Bulletin of the Faculty of Fisheries, Hokkaido University 3, No. 4, 240 (March, 1953)
(English summary and figures)

This instrument was designed for taking marine or lake muds and benthos by hand. The height of the device is 45 cm., the breadth 24.5 x 24.0 cm., and the weight 8.7 kg.

9.12 TUNA MARKING, A PROGRESS REPORT

Wilson, Robert C.
California Fish and Game 39, No. 4, 429 (October, 1953)

9.13 REACTION OF FISH TO WATER OF LOW OXYGEN CONCENTRATION

Jones, J. R. Erichsen
J. Exptl. Biol. 29, 403-15 (1952)
Chemical Abstracts 47, No. 11, 5565 (1953)

9.16 A CENTURY OF AMERICAN FISH CULTURE, 1853-1953

Wood, E. M. (Fish and Wildlife Service, Kearneysville, West Virginia)
Progressive Fish-Culturist 15, No. 4, 147 (October, 1953)

9.17 ELECTRIC SHOCKING OF LAMPREYS PROVES EFFECTIVE

Bentz, Ted
Atlantic Fisherman 34, No. 8, 16 (September, 1953)

9.17 DAMS AND FISH. CAN THEY USE THE SAME STREAM?

Anonymous
Pacific Fisherman 51, No. 10, 25 (September, 1953)

9.17 PREDATORY SEALS AND THE COMMERCIAL FISHING INDUSTRY

Hardy, Eric
World Fishing 2, No. 8, 310 (August, 1953)

9.19 THE BEHAVIOR OF THE HORSE MACKEREL SCHOOLS RECORDED BY FISH-DETECTOR

Owatari, Atsushi; Furuno, Kiyotaka; and Furuno, Kiyokata
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 8, 362 (1953)
(English summary and figures)

Horse mackerel stay deep in the water making a school of pyramidal shape during daytime (Fig. 1, omitted), but from an hour after sunset, they move to the surface of the water for the seeking of food (Fig. 2, omitted).

9.19 THE BEHAVIORS OF THE SARDINE SCHOOLS BY FISH-DETECTOR

Owatari, Atsushi; Furuya, Kiyotaka, and Furuya, Kiyokata
Bulletin of the Japanese Society of Scientific Fisheries 18, No. 12, 669 (1953)
(English summary and figures)

Mature sardines assembled in deeper water and gathered closer to the fishing light. After sunset they formed shoals spreading in the shape of belts. With advancing age they prefer deeper water.

9.2 YEARBOOK OF FISHERIES STATISTICS 1950-51

Food and Agriculture Organization of the United Nations
Rome, Italy (1953)

The statistics reported are presented in tabular form under the subject of I - Catch; II - Utilization; III - External Trade; and IV - Fishing Craft.

9.2 SOME ASPECTS OF THE DOMESTIC MARKET FOR PACIFIC COAST FISHERY PRODUCTS

Garfield, Morton J.
Pan American Fisherman 8, No. 1 (August, 1953)

9.7 MASSACHUSETTS UNIVERSITY ADDS FISHERIES COURSE

Anonymous
Atlantic Fisherman 34, No. 8, 24 (September, 1953)

The University of Massachusetts has announced a new four-year course in fisheries technology. This will be an undergraduate program leading to the bachelor of science degree in fisheries technology. The course will be administered by the food technology department, headed by Dr. Carl R. Fellers.

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